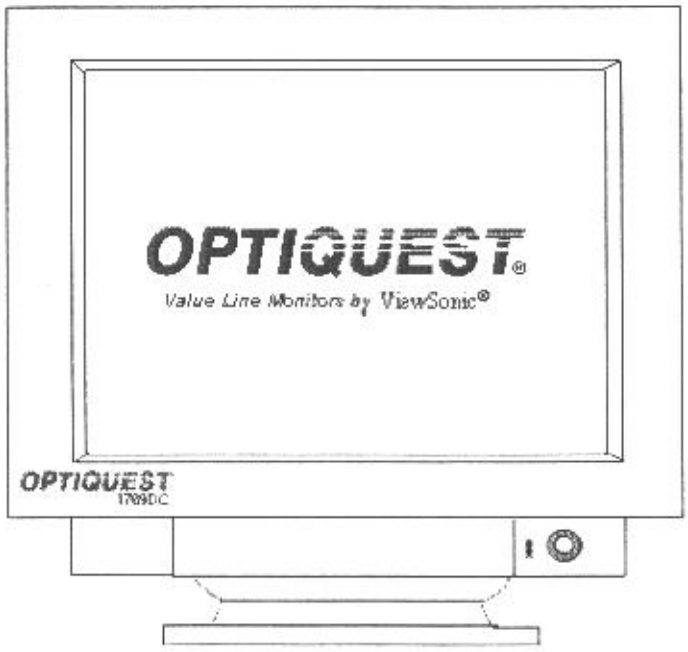
Service Manual

OPTIQUEST 1769DC

Model No. 1769DC-1

17" Digital Controlled Color Monitor
Value Line Series



(Rev. 1 - July 1996)

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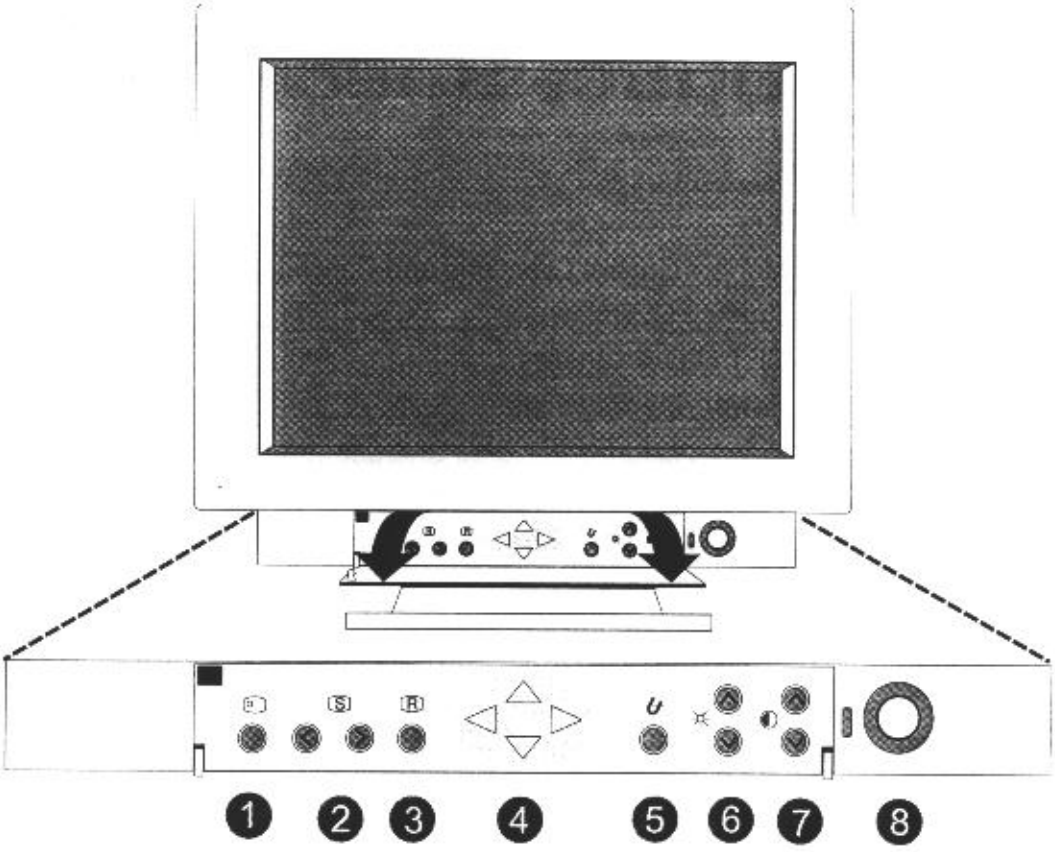
Section 8.
Mechanical Parts

Section 9.
PCB Component List

Section 1.
Product Specifications

1.1. Monitor Control Locations & Functions



KEY TO BUILT-IN MONITOR CONTROL FUNCTIONS		
❶	**OSD**	Press to enter and exit the OSD menus.
❷	**Select buttons**	Press to select the OSD option to change.
❸	**Recall**	Press to recall the factory preset defaults.
❹	**Adjustment buttons**	Use these to increase or decrease values when adjusting the OSD options.
❺	**Degauss**	Press to degauss the monitor
❻	**Brightness**	Press to increase or decrease the monitor's brightness..
❼	**Contrast**	Press to increase or decrease the monitor's contrast.
❽	**Power On / Off**	Press to turn on or off the power to the monitor.

1.2. Product Overview

The monitor 1769DC-1 described in this service manual has the following features:

- 17 inch 0.27 or 0.28mm dot pitch conventional CRT
- 30-69kHz horizontal scanning
- Ten preset modes
- Universal segmented auto range power supply
- VESA/NUTEK/EPA compliant power management

1.3. CRT Characteristics

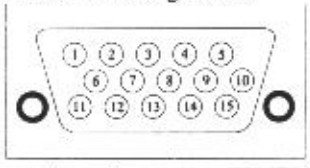
- Screen Size..... 17 inches
- Faceplate Type..... FS
- Orientation..... Landscape
- Phosphor Dot Pitch ..... 0.27 or 0.28mm
- Electron Gun ..... 29mm, Precision-In-Line
- Deflection Angle ..... 90 degree diagonal
- Shadow Mask ..... Invar
- Phosphor Type..... P22
- Phosphor Persistence..... Medium Short
- Faceplate Properties..... ASN antistatic, antireflection
- Standard Light Transmission. 53.5% Typical

1.4. Power Specifications

- A/C Receptacle IEC320
- Power Supply Type ..... Universal
- A/C Line Voltage Ranges ... 88VAC - 132VAC
180VAC - 264VAC
- A/C Line Frequency Ranges . 50Hz/60Hz ±3Hz
- Inrush Current ..... 30A/132V or
50A/264V (at cold start)
- Leakage Current ..... ≤3.5ma
- Degauss ..... Automatic and Manual

1.5. Video Input Signal Characteristics

- Video Type ..... Analog
- Amplitude ..... 700mV maximum
- Video Input Impedance..... 75 Ohms ±1%
- Video Connector Pin Assignments:



Pin	Signal	Pin	Signal	Pin	Signal
1	Red video	6	Red return	11	Monitor GND
2	Green video	7	Greenretum	12	SDA
3	Blue video	8	Blue return	13	H. sync.
4	Monitor GND	9	No pin	14	V. sync.
5	Return	10	Sync return	15	SCL

1.6. Sync Input Signal Characteristics

1.6.1. Separate Sync

- Sync Type ..... TTL
- Amplitude ..... 2.4V minimum (Logic High)
0.8V max. (Logic Low)
- Polarity..... Positive or Negative

1.7. Video Amplifier Performance

- Video rate 110MHz
- 90% Rise and fall times..... 12ns
(Measurement shall be made at CRT connector, with output swinging 30Vpp)
- Video generator rise/fall time 2ns maximum
- Scope and probe bandwidth . 350MHz minimum
- Probe capacitance 2.5pf
- Overshoot/Undershoot ..... 15% max.

1.8. Environmental

1.8.1. Temperature / Humidity / Altitude

OPERATING

- Temperature..... 10°C to 35°C
- Relative Humidity . 0 to 90%, non-condensation
- Altitude ..... 0 to 10,000 feet

NON-OPERATING

- Temperature..... -40°C to +65°C
- Relative Humidity . 0 to 95%, non-condensation
- Altitude ..... 0 to 40,000 feet

1.8.2. Vibration Test

UNPACKED UNIT

	Frequency	Amplitude (m/m)	Acceleration (G)
1	5 - 22Hz	0.25mm	–
2	22-500Hz	–	0.25G

Times/Cycle:

- Rise Time..... 10 Minutes
- Fall Time ..... 10 Minutes
- Number of Sweeps ..... 1 Cycle
- Axis ..... X,Y,Z
- Total Times ..... 60 Minutes

PACKAGED UNIT

	Frequency	Amplitude (m/m)	Acceleration (G)
1	5 - 50Hz	–	0.83
2	–	–	–

- Times/Cycle:
- Rise Time..... 10 Minutes
- Fall Time ..... 10 Minutes

- ☐ Number of Sweeps 1 Cycle
- ☐ Axis ..... X,Y,Z
- ☐ Total Times ..... 60 Minutes

1.8.3. Drop Test

- ☐ Compliant with NSTA Project 1A guidelines
- ☐ Drop Height 46cm
- ☐ Test Direction ... 1 Corner, 3 Edges, 6 Faces

1.9. Preset Timing Modes

This display has 10 preset display modes configured during manufacture, given in the following table:

Model No.	Ht KHz	Vt Hz	Pixel Rate
01	60.023	75.029	78.750
02	58.230	72.245	75.000
03	50.000	87.030	80.000
04	48.077	72.188	50.000
05	46.875	75.000	49.500
06	37.879	60.317	40.000
07	37.861	72.809	31.500
08	37.500	75.000	31.500
09	35.520	86.960	44.900
10	31.469	59.940	25.175

Section 2.
Disassembly Instructions

2.1. Removing the Cabinet

(A). Remove the four screws at the rear of the display.

(B). Lift the cover vertically away from the monitor.

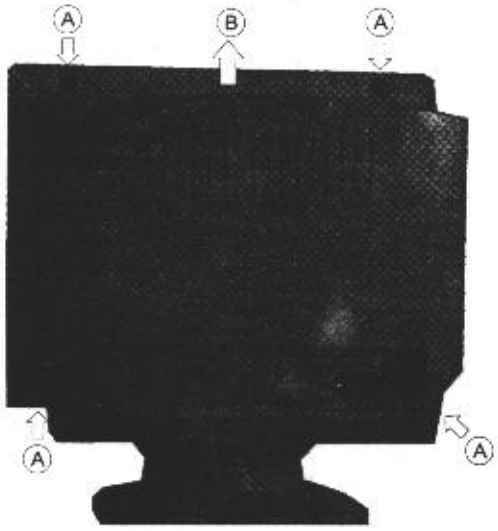


Figure 2-1 Removing the Cabinet

2.2. Internal Disassembly (Right Side)

The neck board is plugged onto the CRT neck and is enclosed in a metal shielding.

(A). Disconnect the degaussing coil from the main board.

(B) Removing the screw from the chassis rear.

(C) Disconnect the ground wires from the metal casing of the neck board.

(D) Remove the Lock Cap from the nylon ties.

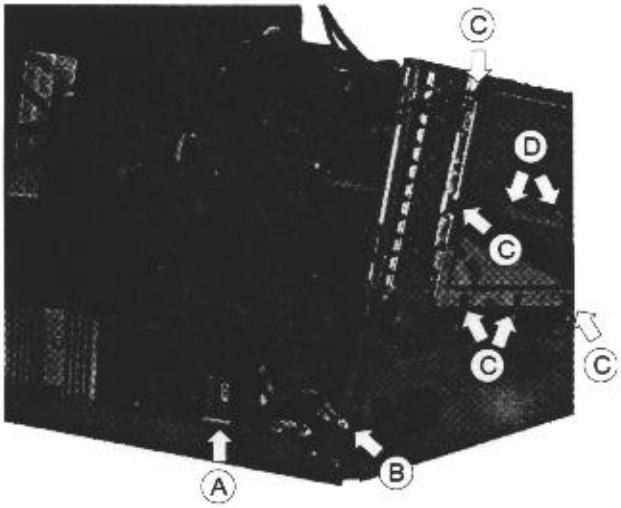


Figure 2-2 Internal Disassembly (Right Side)

2.3. Internal Disassembly (Left Side)

(A) Remove the ground wires from the neck board casing. You may now remove the neck board from the CRT if required. The neck board is secured in place on the CRT neck with Sony bond. Use a flat head screwdriver to prise this away and then pull the neck board away from the CRT neck.

(B) Undo the screw holding the ground wire to the metal frame.

(C) Disconnect the ribbon cable from the logic board and the cable from the CRT connected to the rear side of the logic board.

(D) Remove the CRT anode cap.

(E) Cut the cable tie indicated to free the cables.

(F) Disconnect the 4-pin connector on the CRT yoke cable. You may now remove the logic board if required.

(G) Remove the Neck PCB from the CRT.

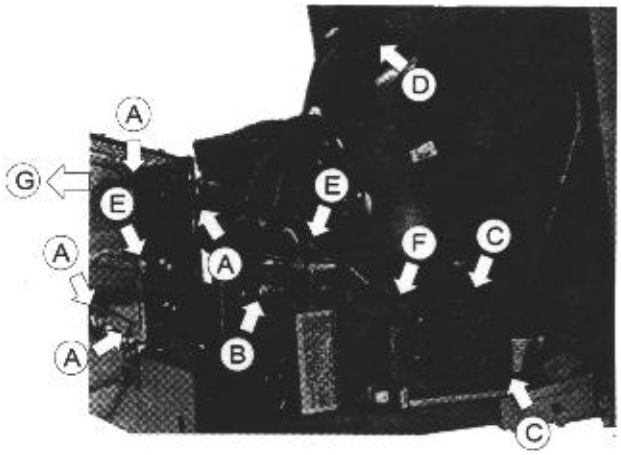


Figure 2-3 Internal Disassembly (Left Side)

2.4. Removing the Main Board

(A) Place the display flat on its face and remove the nylon rivets holding the main board in place on the frame.

(B) Hold the from bezel with one hand and withdraw the main board vertically from the CRT assembly. It may be necessary to pull the plastic frame on either side outwards slightly to disengage the main board from the plastic frame.

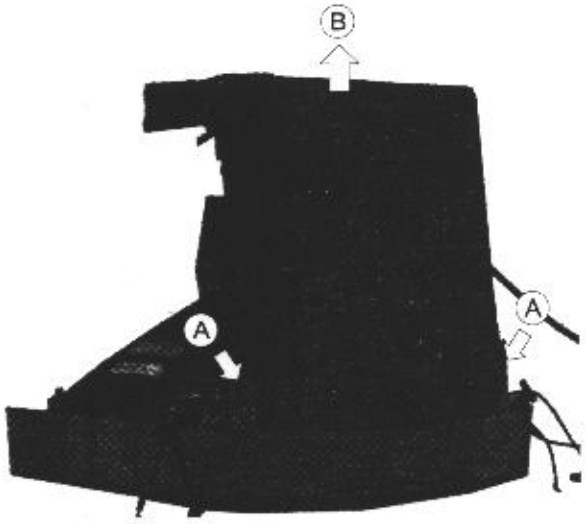


Figure 2-4 Removing the Main PCB

2.5. Removing the Control Panel

(A) Remove the plastic rivets from the bottom of the control panel.

(B) Pull the control panel sub-assembly away from the monitor bezel.

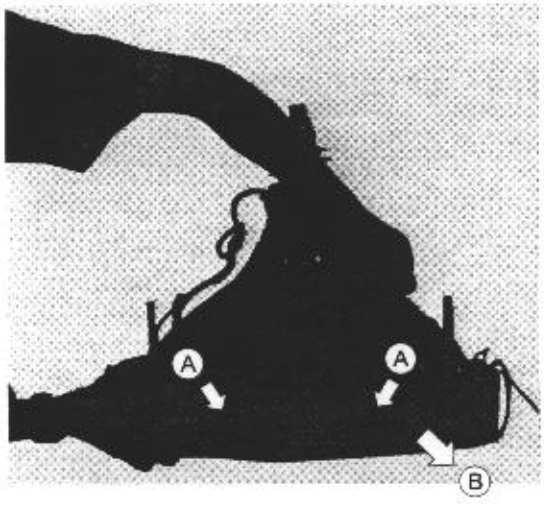


Figure 2-5 Removing the Control Panel

2.6. Removing the Control PCB

(A) Remove the two screws from the PCB.

(B) Remove the control PCB from the control panel.

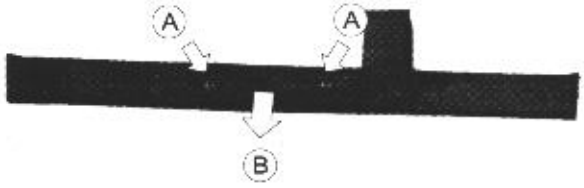


Figure 2-6 Removing the Control PCB

2.7. Removing the CRT from the Front Bezel

(A) Undo the four screws at each corner of the CRT.

(B) The CRT can now be separated from the front bezel and the CRT grounding harness and degaussing coil also removed.

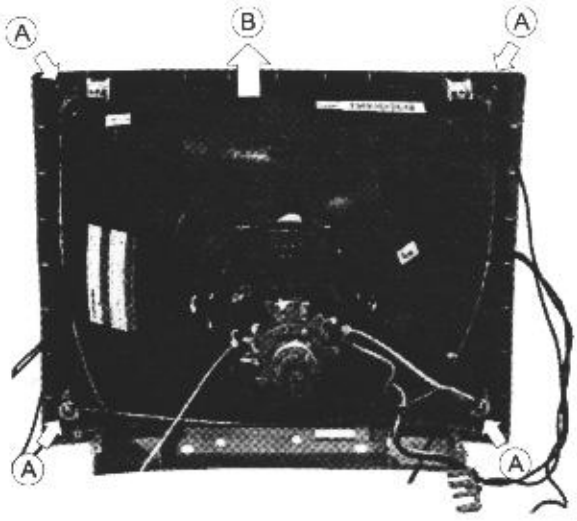


Figure 2-7 Removing the CRT from the Front Bezel

according to the frequency, so a compensation value is provided by D12 in order to reduce the difference in total power for different frequencies. In addition, because the AC input ranges from 85VAC to 270VAC, this causes the value of the direct current on the DC bus to vary, affecting the rise rate of IP, the oscillator and the duty cycle, and causing the test value obtained at Pin 3 of IC2 to vary. To resolve this, a compensation value is provided by R39 and R41 which reduces the difference resulting from the different input voltages.

3.1.2. DC to DC Circuit

Another special characteristic of this power supply is the addition of a DC to DC circuit to the output. In order to support the monitor at different frequencies, a similar high voltage is required (26kV). To accommodate this requirement, a buck loop has been added to the 200V output. The synchronization signal is got from the monitor H.D. area, and after getting synchronization through QP1 trigger ICP2, a high voltage feedback signal (FB), is input to QP2 to obtain the DC level. A comparison is carried out between Pin 5 of ICP2 and ICP3 to establish the duty cycle of transistor QP3 (IRF840) so that even under different frequencies, a similar high voltage value is still obtained.

3.2. The Deflection Circuit

Please refer to the block diagram of the deflection circuit and video circuit and Logic circuit.

3.2.1. IC304 TDA9102C

1. IC304 TDA9102C is a horizontal and vertical processor. The horizontal section consists of a TTL interface, two comparators and an oscillator. The vertical section consists of a TTL input interface and an oscillator. This IC includes a voltage stabilizer to provide about 8V.
2. When sync is input as a TTL level, this causes a negative edge trigger. Pin 4 serves as the H-sync input point and Pin 14 as the V-sync input point.
3. Pins 6 and 7 are the collector (C) and emitter (E) of the IC's internal transistor. The output from Pin 7 is not enough to drive T301 as the output current of IC304 is small, so Q345 and Q310 are used to amplify the current to drive T301.
4. Pins 1 and 2 provide the external control of the horizontal oscillator free run. Free run is controlled by changing the resistance value of R383 R379 R403 and C392 to obtain different DC voltage levels. By adding an external F/V on Pin 1, the difference between a variety of input frequencies and free run is maintained at a similar level. In this way, when different timing modes are input, if the ratio between the active display and total display is similar, then the position of the phase will also be similar.
5. Pins 12 and 13 provide the external control of the vertical oscillator free run. Free run is controlled by changing the resistance value of R388 to obtain different DC voltage levels. By adding an external F/V on Pin 12, the difference between a variety of input frequencies and free run is maintained as similar. The vertical free run trigger synchronization point will affect the amplitude of Pin 15 V-output. Since the difference between each input frequency and free run is similar, this means the synchronization trigger level is also similar, making the V-OUTPUT at Pin 15 also similar. As long as the ratio of the width of active display to total display is similar, then V-SIZE will be similar. For example, the ratios of 35kHz 800x600 and 37kHz 800x600 are approximately the same so they only use one VR (please refer also to the explanation of vertical deflection).
6. The Horizontal phase of different modes can be individually adjusted by changing the VDC level at Pin 10.
7. The vertical size of different modes can be individually adjusted by changing the VDC level at Pin 16.
8. The vertical linearity can be changed by altering the VDC level at Pin 17.

3.2.2. Vertical Deflection Circuit

1. IC201 TDA8172 consists of a flyback generator, voltage stabilizer, drive circuit and vertical output amplifier.
2. The vertical oscillator circuit

   (a) The frequency and phase of the vertical oscillator circuit is generated by the vertical synchronization signal.

   (b) The synchronization signal is output from Pin 14 of IC304 TDA9102C and, after being processed by the synchronization circuit, is sent to the vertical synchronization oscillator circuit to trigger the vertical oscillator and synchronize the oscillator frequency with the external synchronization signal. The frequency of its internal free oscillation is set by the time constant of R387 and C384. The F/V voltage output from IC307 Pin 15 is used to maintain the difference between the free oscillation frequency and external synchronization signal frequency at a similar level and make the sawtooth wave amplitude from Pin 15 of IC304 the same.

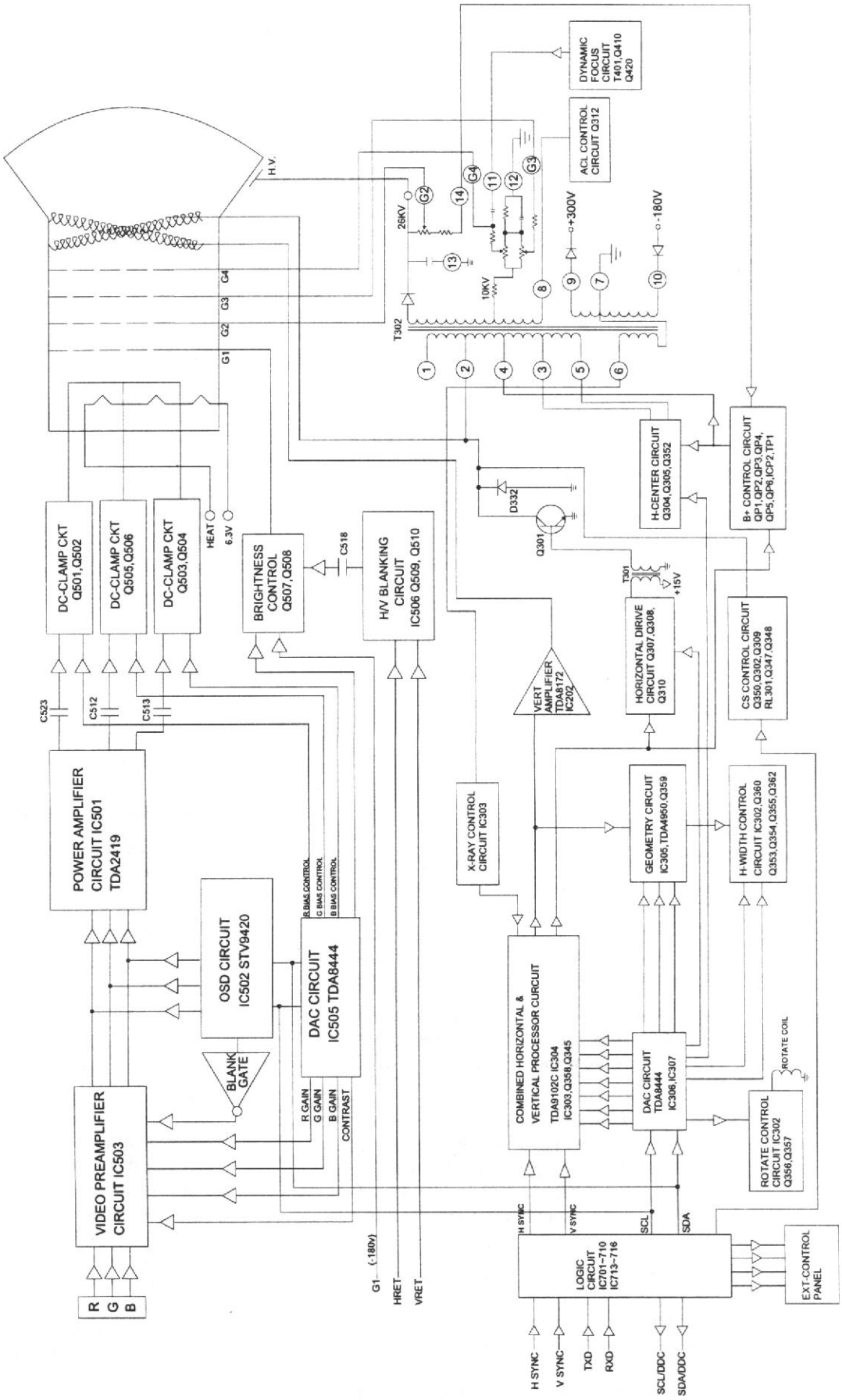


Figure 3-2 Video, Logic and Deflection Block Diagram

3. **Vertical Size Control**

The pulse voltage output by the oscillator is sent to the sawtooth wave generator. The size and amplitude of the voltage of the sawtooth wave generation can be changed by DC value which output from Pin10,11 of IC306 and the vertical size can thus be controlled. This sawtooth wave voltage passes through a buffer and is output from Pin 15 of IC304 to Pin 1 of IC202 TDA8172 of the vertical drive circuit.

4. **Vertical Drive Circuit**

(a) It is not sufficient to rely solely on the oscillator circuit output to ensure the stability of the vertical output, so a first or second level amplifier circuit must be inserted between the oscillator circuit and the output. This circuit is called the drive amplifier and in addition to amplifying the sawtooth wave also corrects the vertical linearity.

After adding the drive circuit, because the level of amplification can be considerable, enough negative feedback can be added to correct vertical linearity and increase the stability of the circuit.

(b) If the current of the sawtooth wave flowing through the deflection yoke is distorted, then the top and bottom portions of the display will be expanded or compressed, resulting in poor linearity. In order to solve this problem, correction of the linearity of the sawtooth wave can be carried out before the drive level.

5. **IC201 TDA8172 Vertical Drive Circuit**

(a) IC202 uses a double power source, so it can be viewed as an OCL drive amplification circuit.

(b) Pin 15 of IC304 outputs a sawtooth wave which is input from Pin 1 of IC202 and after being amplified is output from Pin 5 of IC202 to the vertical deflection yoke. R202 through R204 negative feedback to Pin 1 to increase the stability of the circuit.

(c) Pin 3 of C202 is connected to Pin 6 of D212 to make a compensatory circuit in order to reduce power consumption during flyback operations.

6. **Vertical Centering Adjustment**

Since IC202 functions as an OCL circuit, VDC is output from Pin 7 of IC201, so the central current can be changed to shift the on-screen display up or down to prevent voltage fluctuation. After adjusting the power stabilizer at Pin 19 of IC304 TDA9102C (about 8V) with R207, R208, R212 and R211, this is input to Pin 7 of IC202 to change the value of the vertical center.

3.2.3. Pincushion Correction Circuit

1. If the width of the border in the center of the screen is insufficient, the waveform shown in Figure 3-3 below, can be used to add to horizontal deflection B+ in order to change the deflection of the horizontal deflection circuit.

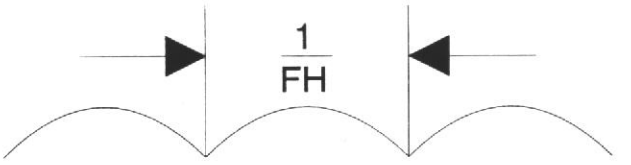
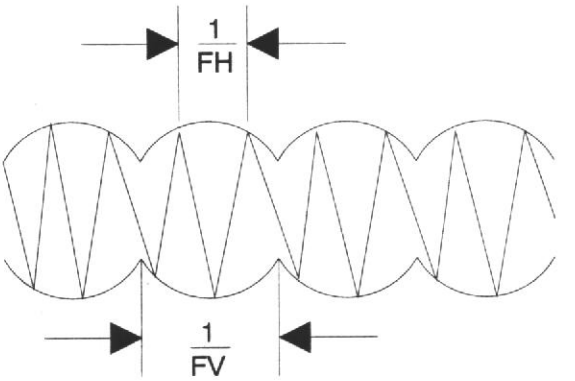


Figure 3-3 Voltage Correction Wave

This waveform is the parabola obtained after regulation of the vertical period, and is created to perform amplitude modulation on the horizontal deflection current, as shown in Figure 3-4



FH: Horizontal Frequency
FV: Vertical Frequency

Figure 3-4 Current Correction Wave

2. The sawtooth wave is output from Pin 15 of IC304 and through IC305 TDA4950 for integration regulation into a parabola. It is output from Pin 5 of IC305 and passed through C354 and R360 and input to Pin 2 of IC302. It is then output from Pin 1 of IC302 and after being sent to Q353's collector output, is added to horizontal B+ to provide pincushion distortion correction.

3.2.4. IC305 TDA4950 Circuit Operation

1. TDA4950 consists of a comparator, a wave regulator and a current limiter.
2. The sawtooth wave from Pin 15 of IC304 passes through R406 and R407, coupled to Pin 2 input, with Pin 3 being a fixed reference current, and after VDC conversion in R393 achieves KEYSTONE compensation.
3. The H-sync signal (output from Pin 6 of T302) is input, passes through R397 D374 and C393, generates a sawtooth wave which is input to Pin8 of IC305. It can output a DC value(0~5V)

from Pin12 of IC307, passes through R394 Q359 coupled to Pin8 of IC305, then can change the DC level of the sawtooth wave, and after passing through Pin 1 and Pin 2 of the wave regulator, a fixed parabola wave is generated at Pin 7 (in order to adjust the waveform at Pin 7, the VDC of the sawtooth wave at Pin 8 must be the same as the VDC of Pin 7. Please refer to Figure 3-5.

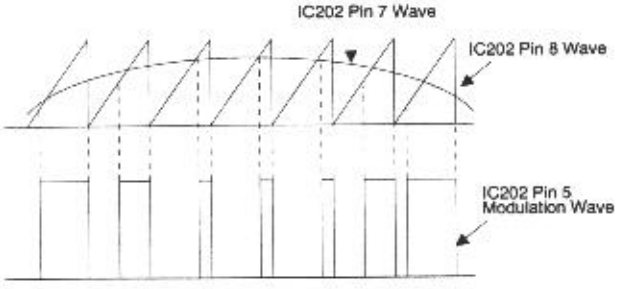


Figure 3-5 IC305 Pin 7 and Pin 8 Waveform

After the waveform has been modified, although the horizontal frequency is not the same, the waveform output at Pin 5 is not the same, and for this reason can be used to correct pincushion distortion. The waveform output from Pin 5 of IC305 is a square wave, and passes through C360 and C354 and is coupled to Pin 2 of IC302.

3.2.5. Structure of Horizontal Deflection Circuit

The function of the horizontal deflection circuit is to cause left/right scanning of the electron beam using the sawtooth wave current flowing through the horizontal deflection yoke, and is made up of the horizontal oscillator circuit, horizontal drive circuit, horizontal output circuit, synchronous AFC circuit and high voltage generator circuit.

1. **Horizontal Drive Amplifier**
   In order to rapidly saturate the output transistor (ON) or cut it off (OFF), a sufficient basic current must be provided. Because of this, an amplifier circuit is added between the oscillator circuit and the output circuit to amplify the pulse voltage. At the same time, after the waveform has been regulated, by adding this circuit to the output circuit, this amplification circuit functions as a drive amplifier.

2. IC TDA9102 consists of a vertical sawtooth wave generator, horizontal sawtooth wave generator, horizontal oscillator circuit, vertical oscillator circuit, AFC circuit, phase regulator circuit, X-RAY circuit and drive amplification circuit. This IC includes the vertical and horizontal circuits combined in one package.

When the horizontal signal is sent to Pin 8 of the AFC circuit and receives a pulse back to Pin 4 from the horizontal output, the difference between these two phases is used to calculate the Automatic Frequency Control (AFC) voltage, and control the frequency of the horizontal oscillator circuit at Pin 8 through R398 R303 C322 and ZD308. The horizontal frequency is determined by the time constant of R384 R385 and C382, and is output from pin 7, coupled through T301, and supplies the base current for the horizontal output transistor Q301. This is the basic procedure of horizontal deflection.

3. **Horizontal Output Circuit**
   The horizontal output circuit uses the switch operation of a transistor and a damping diode, and provides a sawtooth wave current to the deflection yoke. The horizontal deflection yoke is made up of the L value on the coil and resistance r inside the coil connected in series. Its resistance is extremely small, and the time constant (L/r) is extremely large. Because of this the voltage at the two terminals of the coil cause rapid variation in the current flowing in the coil still will slowly vary, creating a sawtooth current. The basic circuit and equivalent circuit are shown in Figures 3-6 and 3-7.

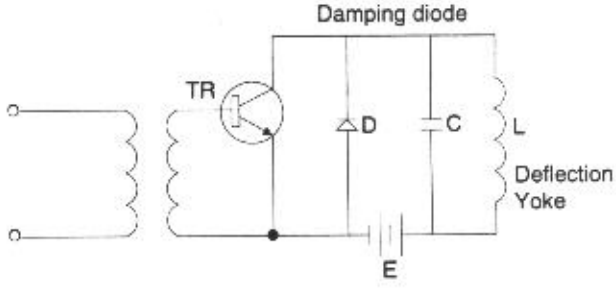


Figure 3-6 The Basic Deflection Circuit

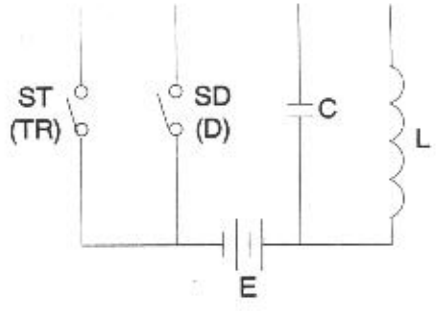


Figure 3-7 Equivalent Circuit

4. **Horizontal Output Circuit Operation**
   Refer to Figure 3-8 above for the current wave of the voltage of the horizontal output circuit during operation.

   (a) t1 — t2 Period
   The base of the output transistor is added to the forward bias voltage. As the current through the base is very large, it will cause the output

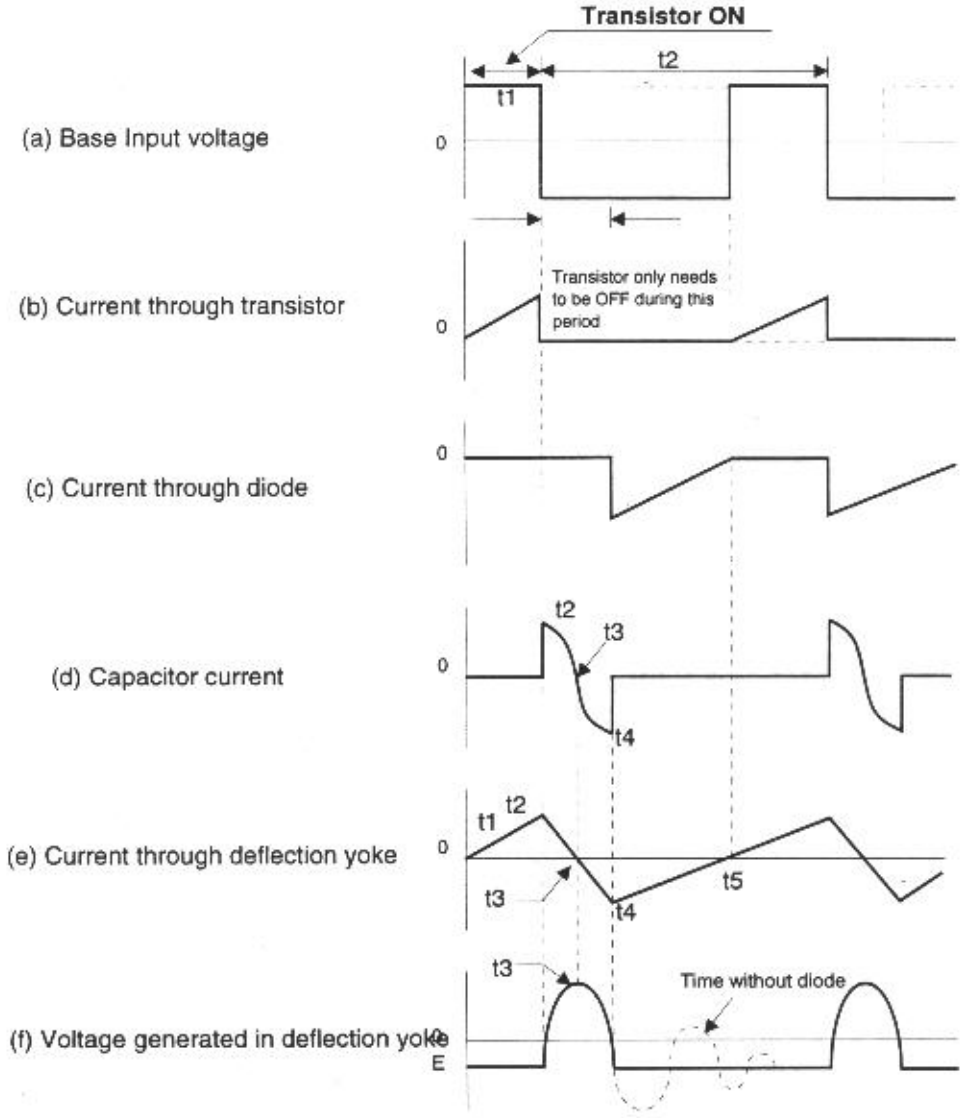


Figure 3-8 Horizontal Output Voltage/Current Waves

transistor to be saturated, corresponding to the ON state of S1 in the equivalent circuit. At this time the deflection yoke contains a current flow and because the time constant is large, the current will slowly show a linear increase as shown in Figures 3-8 (b) and 3-9 (a).

(b) t2-T3 Period

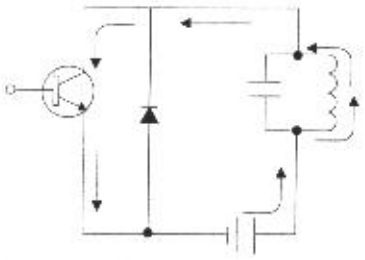
At t2, a negative load is applied to the to the base and the output transistor changes to OFF (S1 in open state). There is no current passing through the transistor at this time and the L and C components of the deflection yoke become independent oscillation circuits. If the current is suddenly cut off, then the polarity of the inverse voltage generated at L will be as shown in Figure 3-9, (b). This voltage is viewed as the source voltage and will cause current to flow, at which time the current flowing to C is as shown in Figure 3-8 (d). At time t3 this current is 0 but the voltage at the two capacitor terminals is at maximum. This waveform is known as flyback pulse, and is shown in Figure 3-8 (f).

(c) (t3 — t4) Period

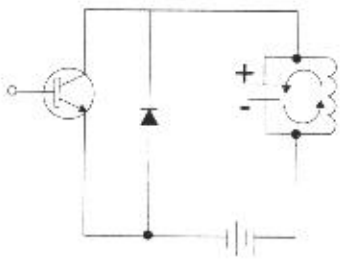
The energy accumulated in C is released to the deflection yoke, the direction of the current flow being shown in Figure 3-9 (c). The current increases as the voltage on C decreases, and at time t4, the voltage of C is 0, at which time the current is at maximum, which means the current flowing into the deflection yoke is also maximum. C is then charged and if a damping resistor is not connected, the energy between L and C will be reversed, which is the oscillation frequency set by the oscillator at L and C.

(d) t4 — t5 Period

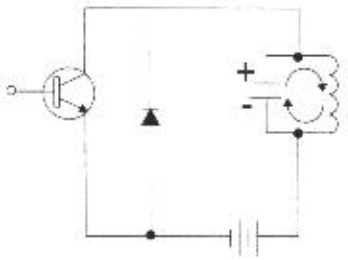
At t4, the voltage of C is 0. After this it is recharged in the opposite direction and this voltage exceeds the voltage of the power source at time t4. At this time the damping diode is ON and the L and C circuits are shorted out and stop oscillating. Because of this the time constant of r and L in the damping diode is large so the current flowing in the deflection yoke does not suddenly become 0.



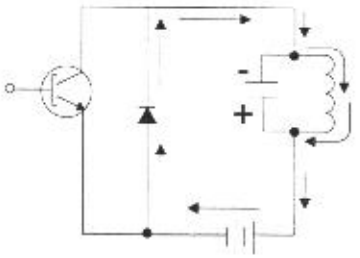
(a) Second half of scanning period (t1 - t2)



(b) First half of return line period (t2 - t3)



(c) Second half of return line period (t3 - t4),



(d) First half of scanning period (t4 - t5)

Figure 3-9 Polarity of Transformer Voltage

The current shows a linear decrease, and when it becomes 0 at time t5 the transistor is ON and the operation described above is repeated.

(e) As described above, the current flowing in the deflection yoke during scanning is the sum of the current which has passed through the transistor and the damping diode current. Please refer to Figure 3-8(e).

3.2.6. Horizontal Size Control Circuit

1. The different DC value output from Pin 9-10 of IC307 passes through the distributed voltage from R359 and R358 achieves one fixed DC value which is sent to Pin 3 of IC302, so the VDC from Pin 9-10 of IC307 is not the same, causing Pin 1 of IC302 to output a different DC volue, after passing though the buffer, collector of Q353, output to Q354 Q355 Darlington current amplification though L304 to adjust the current though H-DY's current value achieving size control.

3.2.7. X-RAY Protection Circuit

1. The feedback pulse from T302 F.B.T is regulated through D373 to obtain a DC voltage and the appropriate set voltage is distributed by R337 and R339. When the feedback pulse voltage exceeds the set voltage, the +15v output form Pin 7 of IC303, after passing through D371, R401 and input to Pin 8 of IC304. Because of this, IC304 TDA9102C is OFF, so there is no vertical or horizontal sync output form Pin 7,15 of IC304 and the monitor shuts down.

3.2.8. Horizontal linearity and CS Switching

Switching Cs is necessary to ensure the lines are in accordance with the specifications in multi-sync monitors.

- ☐ For frequencies 68~53 kHz, RL301 is on and Q302 is OFF and CS is C311.
- ☐ For frequencies 53~42 kHz, RL301 is ON and Q302 is ON and CS is C313 and C311.
- ☐ For frequencies 42~36 kHz, RL301 is OFF and Q302 is OFF and CS is C311 and C324 in parallel.
- ☐ For frequencies 36~29 kHz, RL301 is OFF and Q302 is ON and CS is C311 C313 and C324 in parallel.

Truth Table of Power Saving Detector				
Mode	Hsync	Vsync	PGTMT1	PGTMT0
On	Pulses	Pulses	1	1
Standby	No Pulses	Pulses	0	1
Suspend	Pulses	No Pulses	0	0
Off	No Pulses	No Pulses	0	0

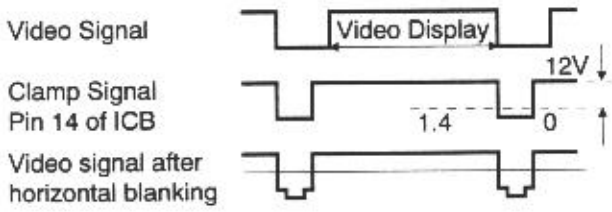
Table of Truth Table of Frequency Discriminator				
	68K~53K	53K~42K	42K~36K	36K~29K
SCAP1	H	L	H	L
SCAP2	H	H	L	L

3.3. Video Amplifier

The RGB video and sync signals are supplied through a video cable directly to the Video Board at connector P501. The RGB signals are terminated in 75 ohms by R501 and R503, R505 and R506.

The RGB signals then enter an LM1207 video pre-amplifier IC, providing synchronous black level clamping, variable picture contrast (gain) and RGB gain balance for color alignment. Separate gain control voltages for the three pre-amplifier channels are provided via R556, R557 and R558 from the TDA8444 DAC which is loaded by the microcontroller via the I2C bus. These inputs enable the individual gains of each channel to be varied to allow channel gain balance. In addition, a common signal is applied on pin 12 to adjust all three channels by the same amount, to allow for overall gain or contrast control.

A synchronous clamping signal is derived from the horizontal sync pulse by one half of IC504. This takes the trailing edge of the horizontal sync pulse, differentiates it through C531, then squares it via the monostable feedback action of C525 and R513 to provide a precise length digital clamping pulse which is applied IC503 via pin 14. The timing is shown in Figure 3-10, below.



NOTE:

A. Clamp1 signal is generated from flyback time.

B. When the Clamp1 signal is less than 1.4Vp-p, the IC's internal clamp loop will operate; when greater than 1.4Vp-p, it will not operate.

Figure 3-10 Timing of Pin 14 Clamp Signal

The outputs of the video pre-amplifier are fed to IC501, a hybrid power amplifier IC type LM2419, through resistors R524, R526 and R528. In addition, On screen DIsplay video information generated by IC502 can be injected via diodes D513, D514 and D515.

IC501 amplifies the video signals to around 35Vp-p. The outputs are AC coupled to the CRT cathodes via C523, C512 and C513. In order to bias the DC level of the cathodes correctly, the AC coupled signal is DC restored by clamping to a DC voltage which can be varied under microprocessor control. Considering Red channel output on IC501 as an example, the signal is clamped by D517 to the voltage set by the two transistor amplifiers formed by Q502 and Q501, which amplify the adjustable voltage at the output of the DAC. A similar stage can be seen for the green and blue channel outputs.

When the RC video signal amplification circuit is added for amplification, this waveform will change as shown in Figure 3-11 (a). Without the DC component, as shown in Figure 3-12 (b), the DC level of darker and brighter displays will be different, so when this kind of signal without a DC component is sent to the CRT, it will cause the contrast of the image to change as the signal changes. Therefore, Q501, Q502 and D517 serve as a DC clamp and the CRT's anode DC voltgae can be adjusted by the DAC.

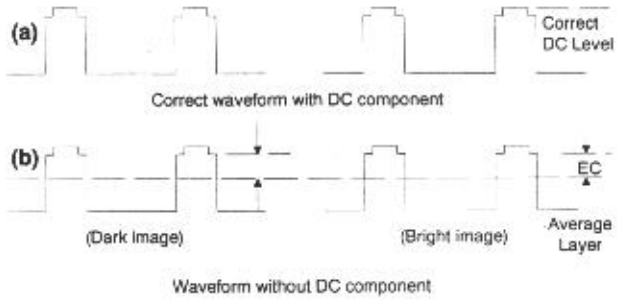


Figure 3-11 Effect of DC Component on Waveform

IC502 is an On Screen Display processor. This is a simple video generation IC that has its own crystal oscillator, X501. by using an internal Phase Locked Loop (PLL) the IC can sync to the incoming vertical and horizontal oscillator frequencies and produce the OSD video signals once initialized and loaded by the commands and data received on the I2C bus. When the OSD display is activated, the blanking output of the IC502 also sends a signal to the blanking input of IC503 (pin 13) to provide an optional black background for the OSD display.

The RGB signals are amplified to drive the CRT by an LM2419 hybrid amplifier and capacitively coupled to the cathodes.

Brightness control is achieved by varying the bias of G1 of the CRT via a transistor stage formed by Q507 which is also driven by an output of the TDA8444. Horizontal and vertical blanking signals are coupled into this amplifier to prevent visible retrace lines.

3.4. Microprocessor And Sync Processing

The microprocessor is an 80C51 type. It has 8k internal masked ROM which contains a basic communication 'boot' routine and various other simple routines. It is also used to store the OSD icon bit maps. The main firmware routines and variable data are stored in the 8k external EEROM, IC702.

When the micro is instructed via the RS232 bus, the internal ROM boot routine will load up the EEROM with program data from the RS232 bus. Thus it can be made to load its own firmware. From then on it will run jointly out of EEROM and internal ROM. Another important routine within the internal ROM is the routine which allows data writes to made to the EEROM. This must be resident in the micro as it cannot run from the EEROM whilst writing data. IC705 and IC704 control the addressing and I/O port selection from the micro.

IC706 allows the micro to scan the front user interface switch matrix. Also specialized ports P1.6 and P1.7 form the IIC bus

interface which is used internally to set the DAC values and the OSD IC.

The micro also drives the sync selection circuits. IC708 is used to set the polarity of the incoming sync signals. IC703 allows the micro to sample the vertical and horizontal syncs and to select the correct polarity on the outputs HSYNC and VSYNC appropriately. In addition, whilst sampling the polarity, the micro can measure the frequency of both syncs. By suitable selection of HSYNC and VSYNC control lines, IC703 can also select the signals derived on HDR and VRET. These two signals come from the horizontal and vertical oscillators. By measuring these with the internal timers, the micro can set up the oscillators for optimum lock to the sync signals. It does this when ever a mode change occurs.

A mode change is detected by either a change in vertical frequency, which is monitored by firmware, or by a sudden change in horizontal frequency. IC712 is clocked and reset by the horizontal sync pulse and the HDR line. If any sync pulse is not matched by a HDR pulse then an interrupt is created on the MODEC line.

When power is disturbed to the unit, the power reset line goes low. This also causes an input to the micro via the MODEC line. On detecting this interrupt, the micro first checks inputs P1.3 and P3.5. If these are also low, then it knows the MODEC interrupt was caused by an impending power failure. In this case the micro saves the current RAM data in EEROM and prepares for power off. The RESET line is delayed for 10ms by R717 and C722 to allow time for the data to be saved. The REST line then holds off the micro and the EEROM until power is good once more.

If the front panel ON/OFF button is pressed, a MODEC interrupt is also created. This time only P3.5 is pulled low so the micro can detect that the interrupt was from the front panel. In this case the micro saves the data but flips the bit which stores the last power on state. The micro is then reset. When the reset disappears the micro bring up the power in the opposite state to before, i.e., if the power was off before then power is now on. In this way the front user on/off switch can toggle the on/off state and also always act as a micro reset switch.

3.4.1. DAC Assignments

The DAC assignments are shown in the table below.

DAC	Addr. Bits A2 - A1 - A0	Ref. Designator	Function
DAC 0-0	0 – 0 – 0	IC306 pin 9	H PHASE1
DAC 0-1	0 – 0 – 0	IC306 pin 10	VSIZE2
DAC 0-2	0 – 0 – 0	IC306 pin 11	VSIZE1
DAC 0-3	0 – 0 – 0	IC306 pin 12	HF1
DAC 0-4	0 – 0 – 0	IC306 pin 113	HF2
DAC 0-5	0 – 0 – 0	IC306 pin 14	HPHASE
DAC 0-6	0 – 0 – 0	IC306 pin 15	PARALLEL-OGRAM (TILT)
DAC 0-7	0 – 0 – 0	IC306 pin 16	VPOS
DAC 1-0	0 – 0 – 1	IC307 pin 9	WIDTH1
DAC 1-1	0 – 0 – 1	IC307 pin 10	WIDTH2
DAC 1-2	0 – 0 – 1	IC307 pin 11	ROTATE
DAC 1-3	0 – 0 – 1	IC307 pin 12	PIN
DAC 1-4	0 – 0 – 1	IC307 pin 13	KEY
DAC 1-5	0 – 0 – 1	IC307 pin 14	VLIN
DAC 1-6	0 – 0 – 1	IC307 pin 15	VFREQ
DAC 1-7	0 – 0 – 1	IC307 pin 16	INHPOS
DAC 0-0	0 – 1 – 0	IC5 pin 9	BRIGHTNESS
DAC 0-1	0 – 1 – 0	IC5 pin 10	G BIAS
DAC 0-2	0 – 1 – 0	IC5 pin 11	B BIAS
DAC 0-3	0 – 1 – 0	IC5 pin 12	R BIAS
DAC 0-4	0 – 1 – 0	IC5 pin 13	R GAIN
DAC 0-5	0 – 1 – 0	IC5 pin 14	G GAIN
DAC 0-6	0 – 1 – 0	IC5 pin 15	B GAIN
DAC 0-7	0 – 1 – 0	IC5 pin 16	CONTRAST

Table 3-1 DAC Assignments

Section 4.
Setup Adjustments

4.1. Preparing the Display for Adjustment

Before adjusting any the display settings or making final adjustments after service, perform the following pre-test settings to prepare the display for adjustment:

1. Be sure to allow the display to warm up for at least 30 minutes before making any adjustments.
2. When making tests and adjustments, the CRT should be facing east or west to minimize the affect of the earth's magnetic field.
3. Set the contrast control at 80% and the brightness control at 50 % for all tests unless otherwise specified.
4. Thoroughly degauss the entire screen with a manual degausser before proceeding with tests.
5. All test should be performed with the rated power supply voltage unless otherwise specified.

4.1.1. Test Equipment Required

The following equipment will be required to make the tests and adjustments detailed in this section:

- ☐ Video signal and pattern generator.
- ☐ Digital multimeter
- ☐ Degausser

4.2. Adjustment Procedures

4.2.1. Adjustment Sequence

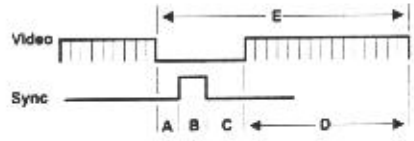
This display undergoes an automatic alignment procedure during manufacture. This alignment procedure follows a fixed sequence of adjustments which are duplicated in this section. When making manual adjustments during service, *you should always make the adjustments in the order given here to ensure correct results.*

4.2.2. Timings Used During Adjustment

The timings required to be imput during alignment consist mostly of the preset timings stored in the display, but one non-preset timing is required for Vertical F/V adjustment. The complete list of standard preset timings and non-preset timing for use in alignment is given in the table below.

IMPORTANT NOTE

The preset timings for different versions of this model may differ from those shown here. Be sure to check the list of preset timings for the unit being serviced.



Mode Number	Mode 1	Mode 2	Mode 3	Mode 4	Mode 5	Mode 6	Mode 7	Mode 8	Mode 9	Mode 10
Preset (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Data Pixel	1024	1024	1280	800	800	800	640	640	1024	640
Data Line	768	768	1024	600	600	600	480	480	768	480
H. Freq (kHz)	60.023	58.230	50.000	48.077	46.875	37.879	37.861	37.500	35.520	31.469
V. Freq. (Hz)	75.029	72.245	87.030	72.188	75.000	60.317	72.809	75.000	86.960	59.940
Pixel Rate (MHz)	78.750	75.000	80.000	50.000	49.500	40.000	31.500	31.500	44.900	25.176
Hor. FP µs (A)	0.203	0.320	1.000	1.120	0.323	1.000	0.762	0.508	0.178	0.636
Hor. Sync µs (B)	1.219	1.813	1.000	2.400	1.616	3.200	1.270	2.032	3.920	3.813
Hor. BP µs (C)	2.235	1.387	2.000	1.280	3.232	2.200	4.064	3.810	1.247	1.907
Hor. Active µs (D)	13.003	13.653	16.000	16.000	16.162	20.000	20.317	20.317	22.810	25.422
Hor. Total µs (E)	16.660	17.173	20.000	20.800	21.333	26.400	26.413	26.667	28.151	31.778
Ver. FP ms (A)	0.017	0.052	0.500	0.770	0.021	0.026	0.238	0.027	0.000	0.318
Ver. Sync ms (B)	0.050	0.103	0.100	0.125	0.064	0.106	0.079	0.080	0.113	0.064
Ver. BP ms (C)	0.466	0.498	0.650	0.478	0.448	0.607	0.740	0.427	0.563	1.048
Ver. Active ms(D)	12.795	13.189	10.240	12.480	12.800	15.840	12.678	12.800	10.810	15.253
Ver. Total ms (E)	13.328	13.842	11.490	13.853	13.333	16.579	13.735	13.333	11.485	16.683
Polarity (H,V)	+,+	-,-	+,+	+,+	+,+	+,+	-,-	-,-	+,+	-,-

Table 4-1 Preset Timings

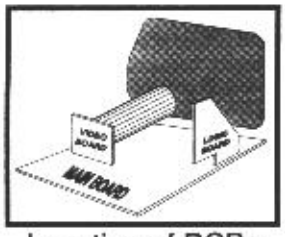
IMPORTANT NOTE

The adjusment settings in this section are based on *REVISION B* of the factory alignment procedures. Appendices detailing changes in the factory alignment procedures that have occurred since publication of this service manual are available upon request.

Initial settings to be carried out manually prior to automatic alignment:

4.3. High Voltage Verification

1. Check that the 75V voltage is 75V±0.1. Adjust VR1(see Figure 4-1 for location) to correct if necessary.
2. Input a cross hatch pattern in 60.024kHz 1024x768 mode and adjust VRP1 on the mainboard(see Figure 4-1 for approximate location) so the high voltage is in the range 26kv±0.3kv.



Location of PCBs

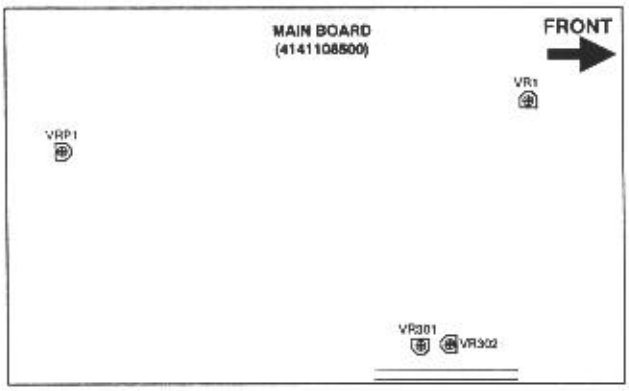


Figure 4-1 Location of Mainboard

Steps used in white balance adjustment:

4.4. Background Brightness Setting

1. Input a mode in 60.023kHz 1024x768 and turn external brightness to maximum. With video input at 0V, adjust the SCREEN VR so background brightness is approximately 1.5FL±0.1FL.
2. Before carrying out white balance adjustment, make sure that the display size and linearity are in spec.

4.5. Screen Brightness Adjust

1. Input a 60.023kHz 1024x768 mode timing with no video input . Adjust VR301 and make ABL no action and adjust external brightness to 0.08FL.
2. Input a full white pattern, set external contrast to maximum and adjust VR302 and check that brightness at the center of the screen is in the range 32FL±1FL. Input a full white pattern, set external brightness to maximum and adjust VR301 and check that brightness at the center of the screen is in the range 36FL±1FL.

4.6. Magnetic Field Configuration

1. Configure the magnetic field as follows:
   - □ Northern hemisphere: H=0.01, V=0.45
   - □ Southern hemisphere: H=0.01, V=-0.52

4.7. Tilt Verification

1. Input a cross hatch pattern in 60.023kHz 1024x768 mode and use the tilt rotation key to ensure that tilt is less than 1mm.

4.8. Focus Verification

1. Input a full white pattern in 60.023Hz 1024x768 mode. Use the external brightness control to adjust background brightness so it is not visible and set external contrast so the brightness is 30FL. Switch to a display of "@" characters.
2. Adjust the FBT focus VR1 and VR2 so the @ characters are as clear as possible.

4.9. Color Misconvergence

1. Input a full white pattern in 60.023kHz 1024x768 mode and adjust external brightness so there is no background brightness and external contrast so the screen brightness is 30FL.
2. Switch to a cross hatch pattern and verify that misconvergence in a circle measured from the center of the screen(Area A) is not greater than 0.3mm, and for all areas outside Area A is not greater than 0.4mm.

Automatic camera alignment procedure:

The procedures listed below are those carried out using the automatic Camera Alignment System(CAS). These adjustments cannot be made manually but must be performed using the CAS software provided by the manufacturer.

4.10. Primary Test Mode(56.47kHz 1024x768 mode)Performance Adjustments

1. **H. RASTER CENTERING**
   Raster area centered horizontally in the bezel.
2. **V. RASTER CENTERING**
   Raster area centered vertically in the bezel.
3. **ROTATION(TILT)**
   Raster area aligned with bezel.

4.11. Performance Adjustments for All Preset Modes

1. **H POSITION**
   Centers the display horizontally in the raster area (L-R<=1mm).
2. **H SIZE**
   Configures display width as 300±3mm.
3. **V POSITION**
   Centers the display vertically in the raster area (T - B<=1mm).
4. **V SIZE**
   Configures display height as 225±3mm.
5. **V. Linearity**

   Configures vertical linearity as less than 8%.
6. **PINCUSHION**
   Sets left and right pincushion distortion to less than 1.5mm.
7. **KEYSTONE**
   Sets upper and lower keystone distortion to less than 1.5mm.
8. **PARALLELOGRAM**
   Sets parallelogram distortion to less than 1.5mm

Conclusion of automatic alignment:

4.12. Image Performance Verification

Input each of the preset timings and check that the following specifications are met:

1. **Horizontal Position**
   L - R ≤3mm
2. **Horizontal Size**
   300 ±3mm.
3. **Vertical Position**
   T - B ≤3mm
4. **Vertical Size**
   225 ±3mm.
5. **Horizontal Linearity**
   H ≤ 10% (10x8 cross hatch pattern)

   This calculation is based on the following formula:

$$\frac{\text{Max} - \text{Min}}{\text{Max}} \times 100\% \leq 8\%$$

6. Vertical Linearity
   V≤8.0% (10x8 cross hatch pattern).

$$\frac{\text{Max} - \text{Min}}{\text{Max}} \times 100\% \leq 8\%$$

7. **Recall Button Function**
   Adjust H/V phase and size at random using the external controls and press the recall button. Check that the image performance has returned to be in spec, which will indicate the Recall button is functioning correctly.

4.13. Uniformity Verification

1. Input a 2" square pattern in 60.023kHz 1024 x 768 mode, set contrast to maximum and check that there is no overshoot. Check that the brightness in the four corners of the screen is not less than 70% of that in the center of the screen.

4.14. Brightness Verification

1. Input a 60.023kHz 1024x768 mode timing with no video input. Adjust external brightness to 0.08FL.
2. Input a full white pattern and adjust external contrast to maximum then check that brightness at the center of the screen shall be more than 30FL. adjust external brightness to maximum and check that brightness at the center of the screen is 36FL±3FL.

4.15. Display Size Stability

1. Inputer a full white pattern in 60.023kHz 1024x768 mode, set external brightness at 5FL and measure the display size. adjust the brightness to 30FL and remeasure the display size. The difference should be less than 2.0mm.

4.16. Color Purity Verification

1. Input a full white pattern in 60.023kHz 1024 x 768 mode and adjust external brightness so there is no background brightness and adjust external contrast to 25FL. Make a visual check of color purity as follows:

   a) Input the red (R) signal only; no green (G) or blue (B) should be visible.

   b) Input the G signal only; no R or B should be visible.

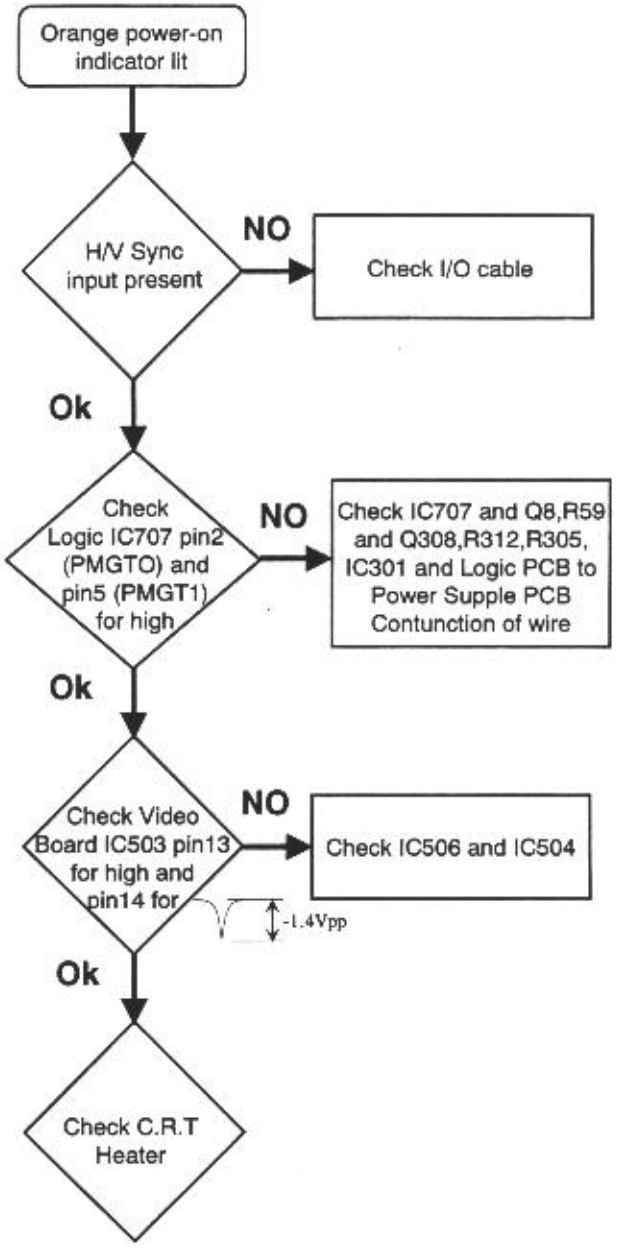
   c) Input the B signal only; no R or G should be visible.

4.17. Video Noise

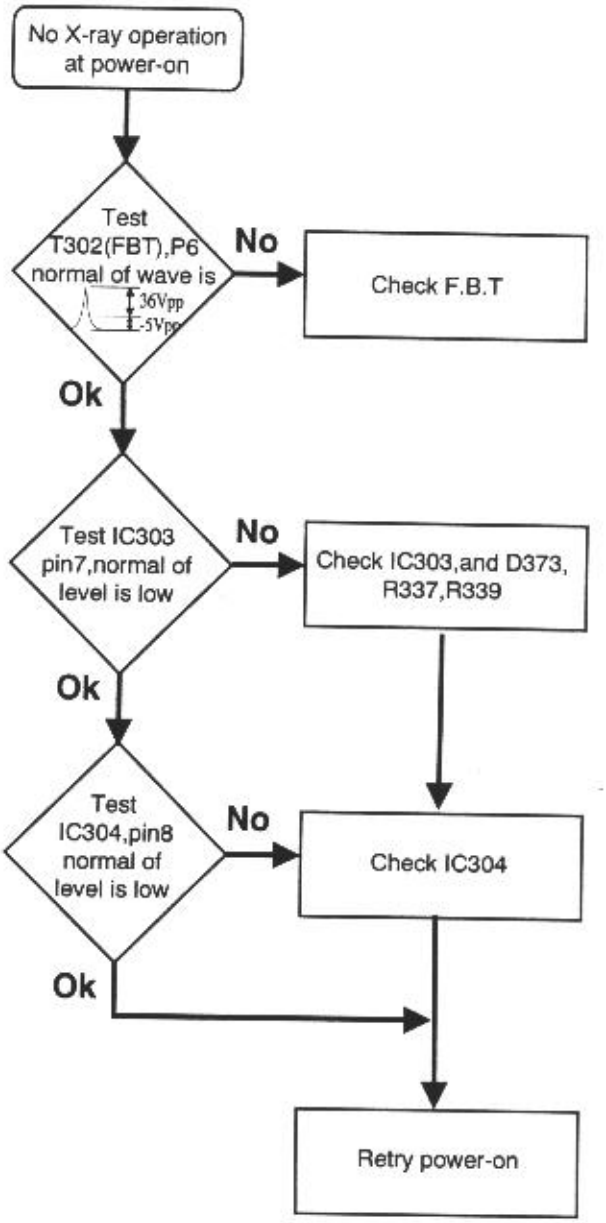
1. Input a cross hatch pattern or full white pattern in 60.023kHz 1024x768 mode and make a visual check from a distance of 48.3cm (19 inches) for any video noise or other on screen interference.

Section 5.
Troubleshooting

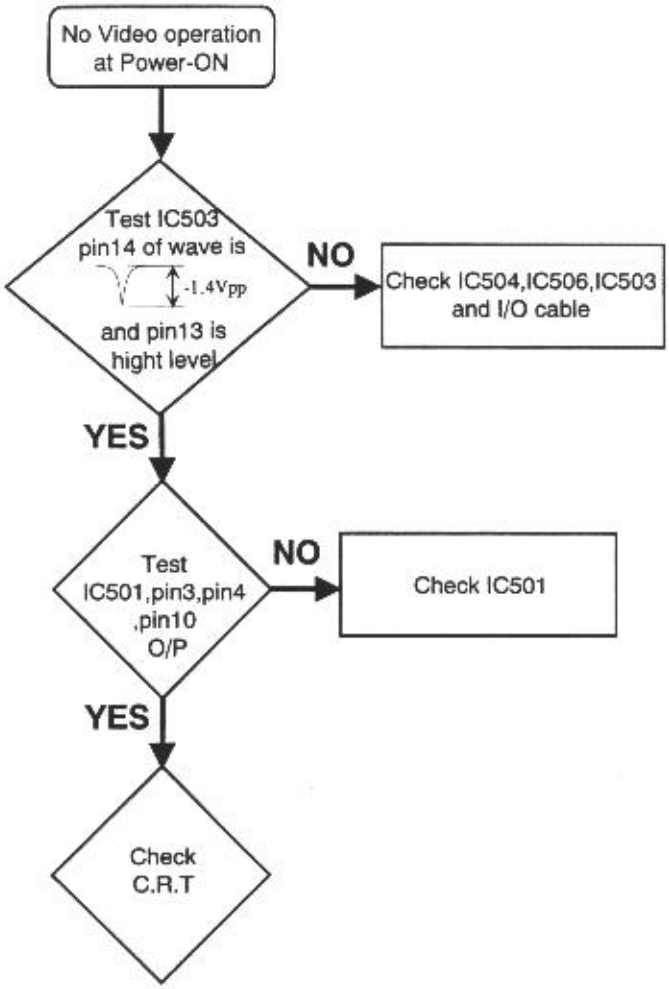
5.1. No Display at Power-on



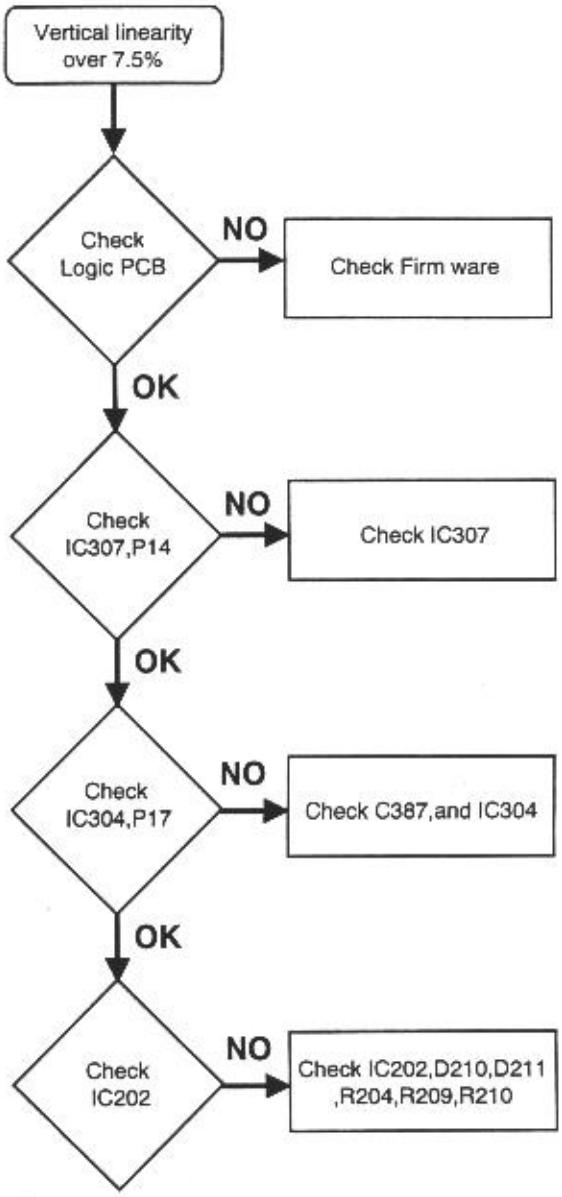
5.2. No X-ray Operation



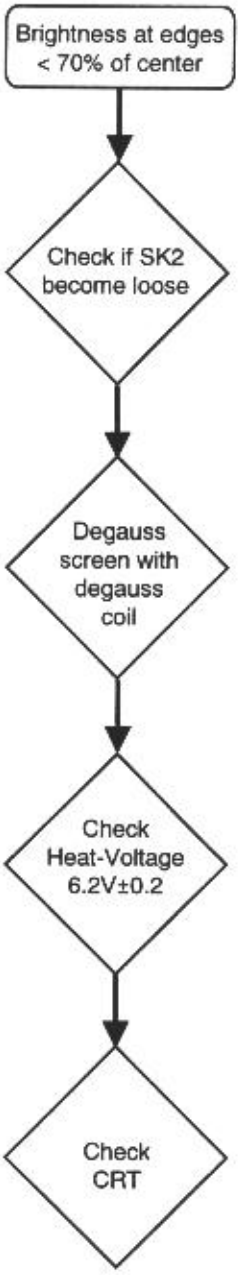
5.3. No Video Operation



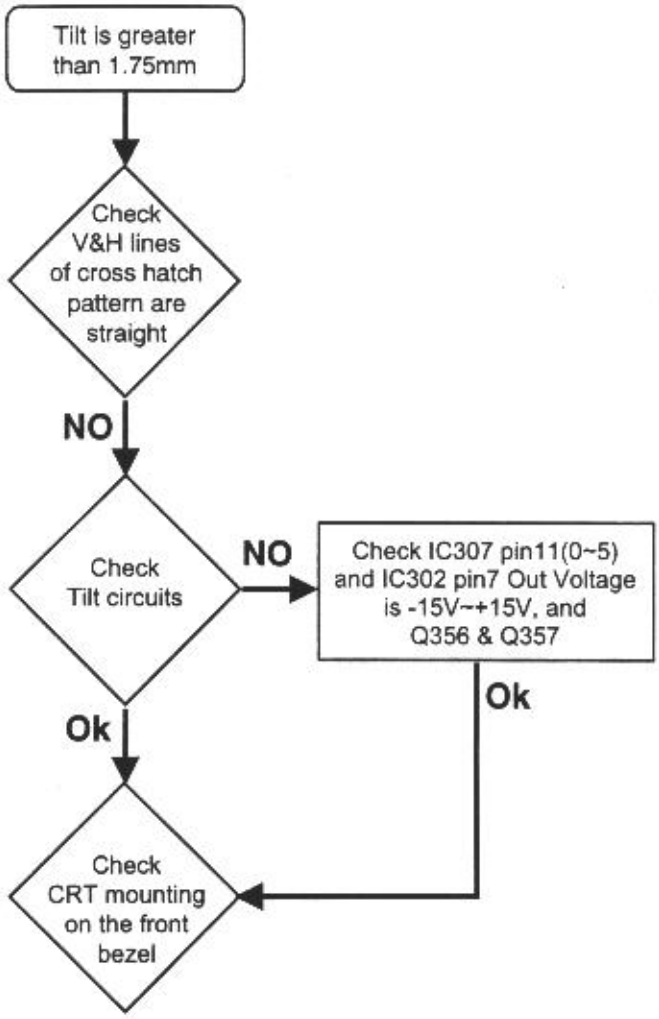
5.4. Poor Vertical Linearity



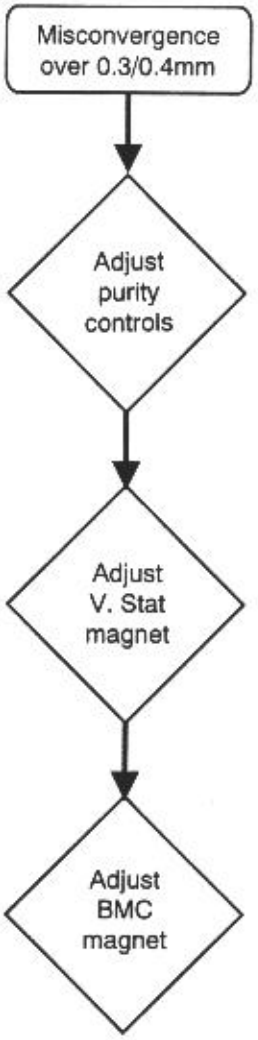
5.5. Poor Uniformity



5.6. Tilted Display Area



5.7. Misconvergence



Section 6.
Printed Circuit Boards

6.1. Main Board

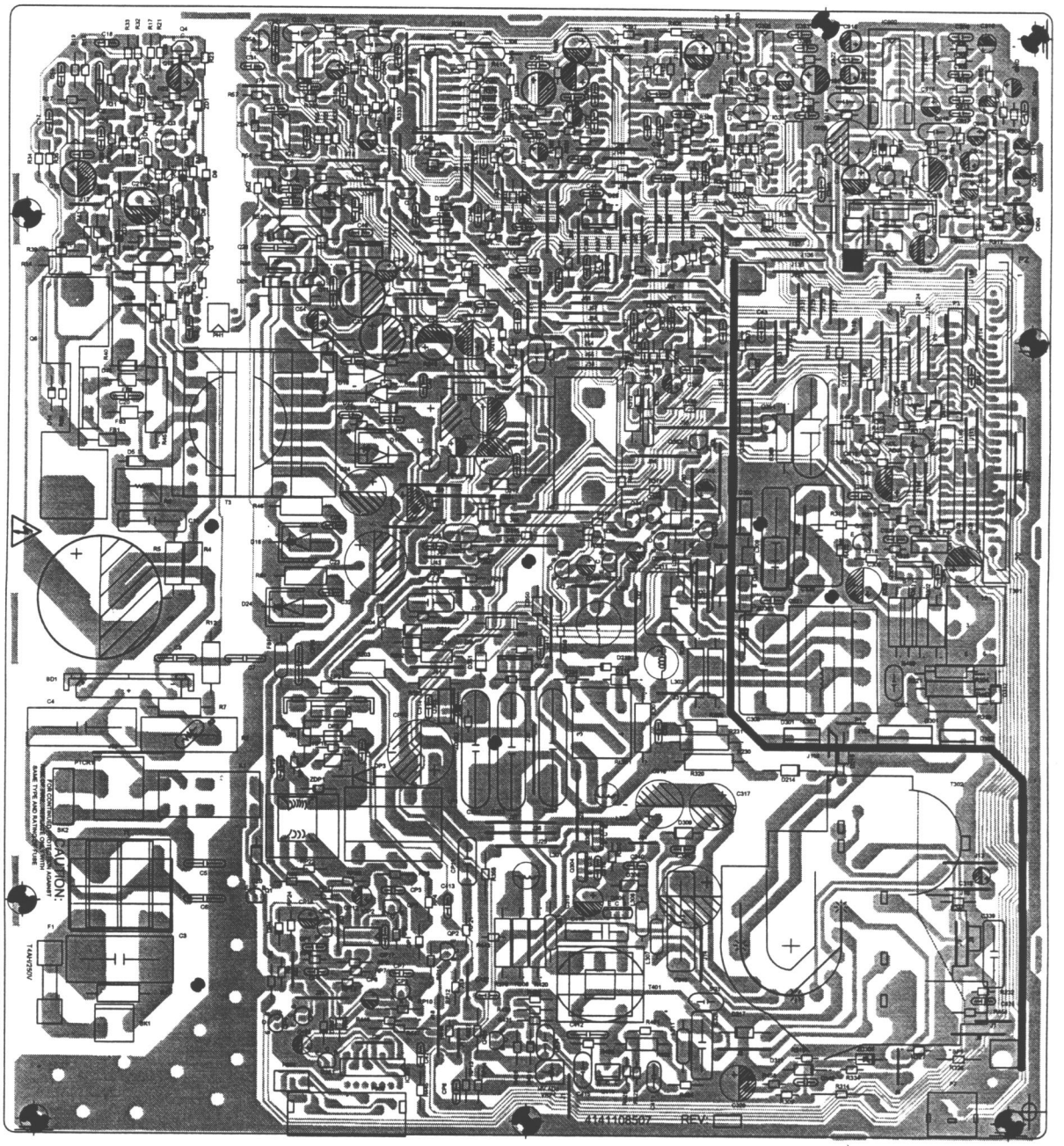


Figure 6-1 Main Board (Solder Side)

6.2. Neck Board

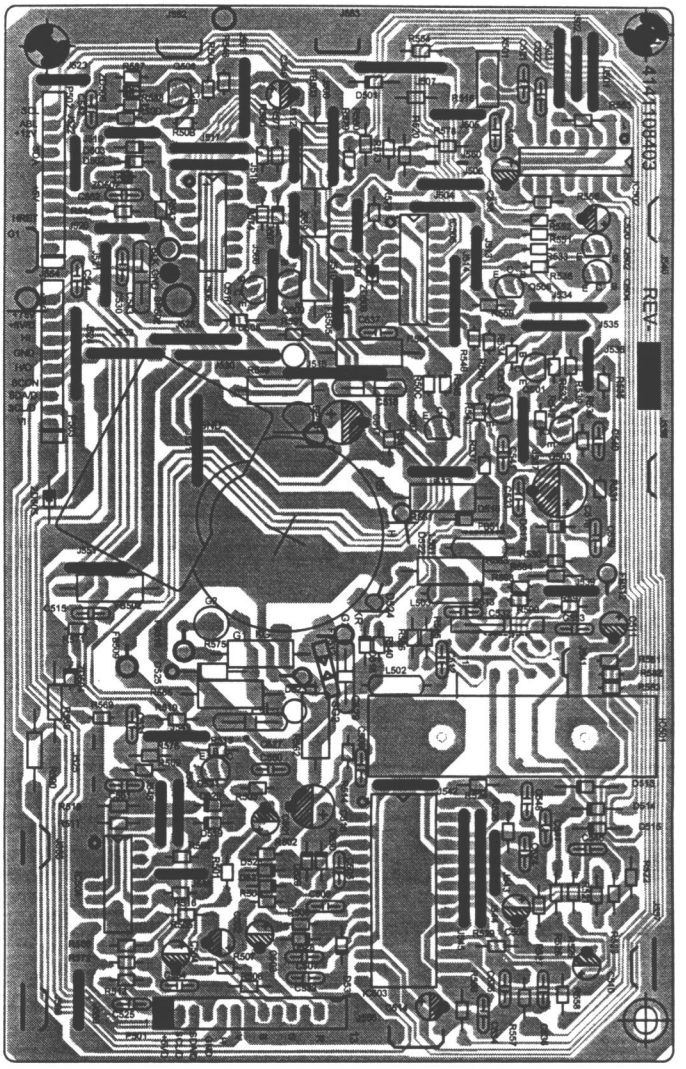


Figure 6-2 Neck Board (Solder Side)

6.3. Logic Board

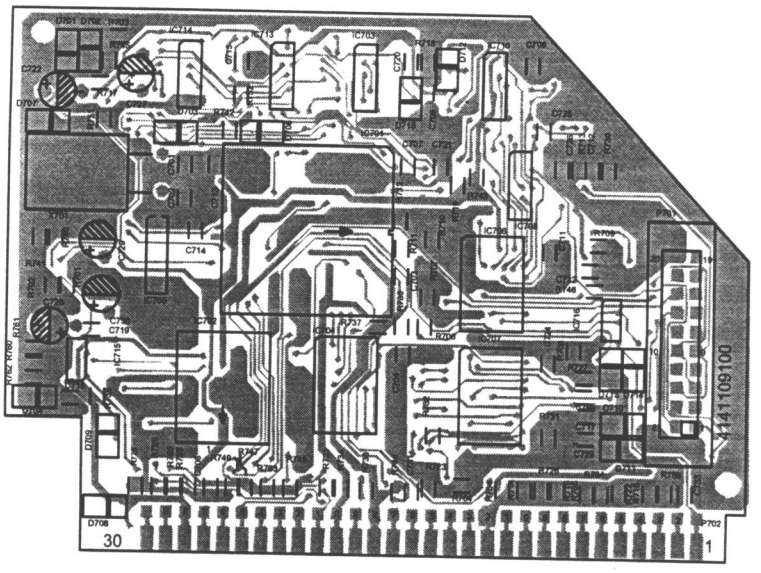


Figure 6-3 Logic Board (Solder Side)

6.4. Control Panel Board

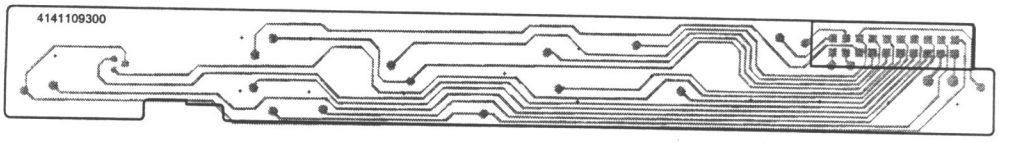


Figure 6-4 Control board(solder size)

Section 7.
Schematic Diagrams

7.1. S/P/S Circuit Diagram

Please refer to the attached circuit diagram.

7.2. Video Circuit Diagram

Please refer to the attached circuit diagram.

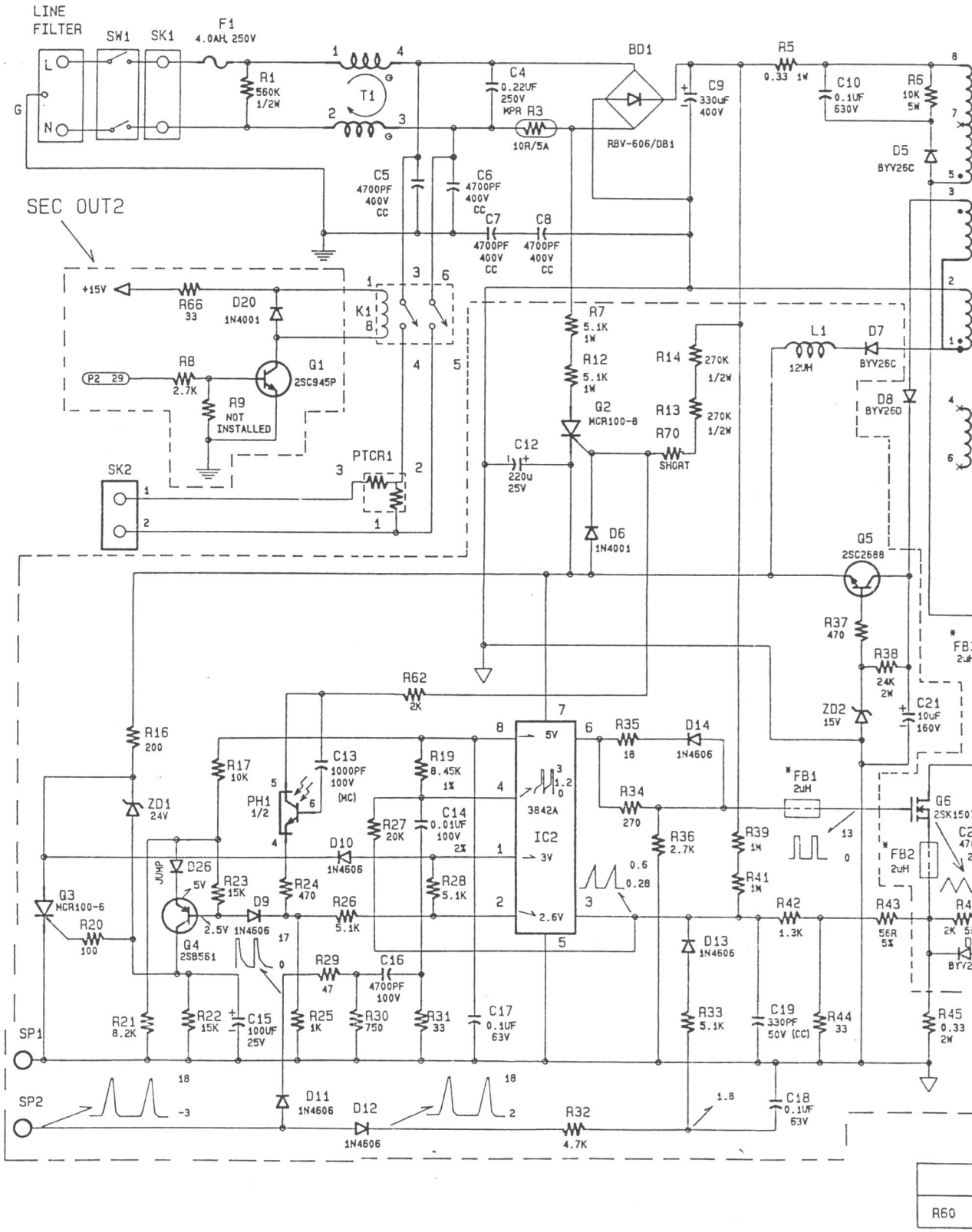
7.3. Logic Circuit Diagram

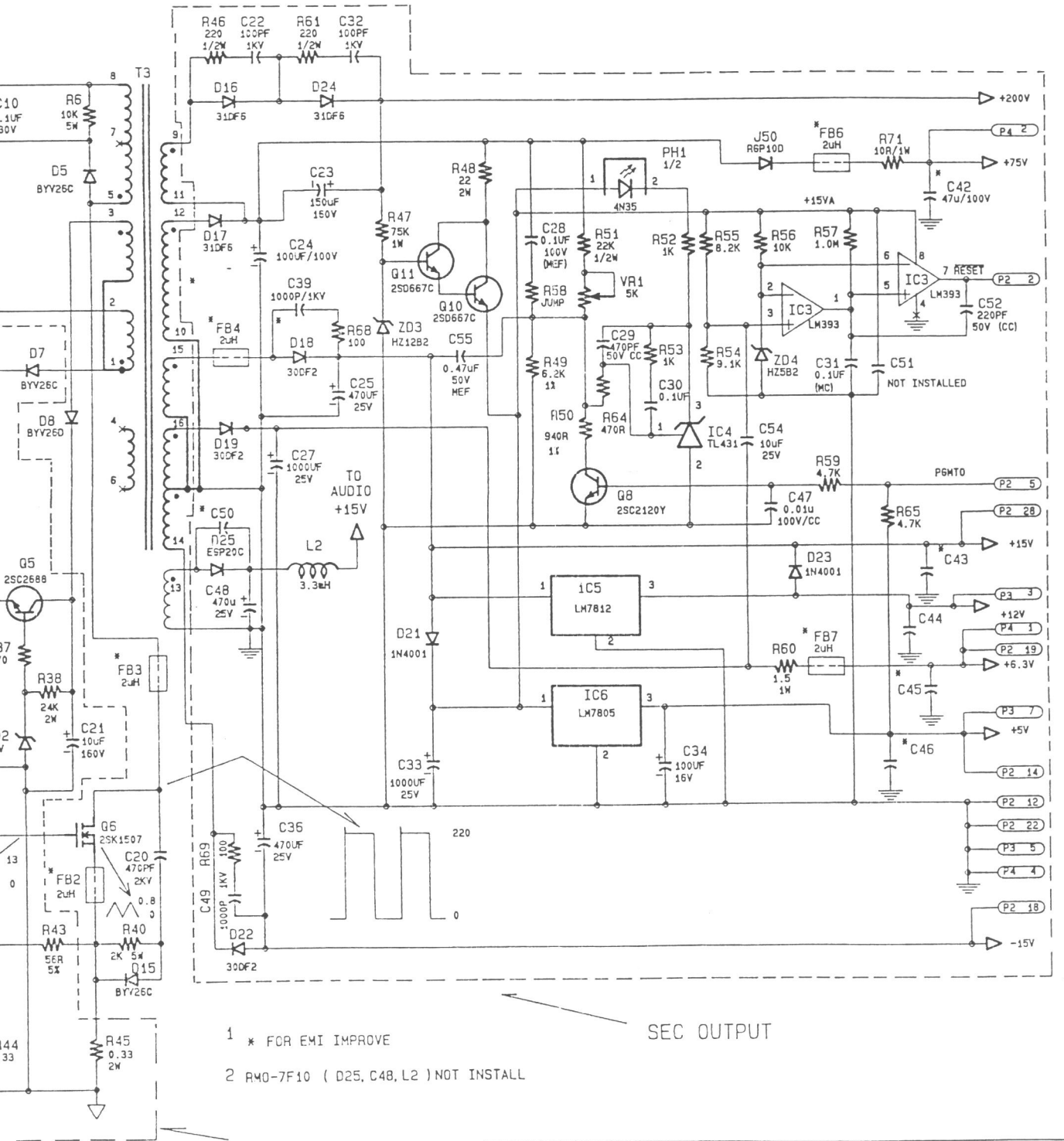
Please refer to the attached circuit diagram.

7.4. Deflection Circuit Diagram

Please refer to the attached circuit diagram.

DATE	ECN/ECO NO.
03-23-'95	N-03099506EG
05-04-'95	N-04189503EG
05-05-'95	O-04189506ET
06-14-'95	O-05159502ET
06-22-'95	O-05299507EC
06-24-'95	O-05319502RC





1 * FOR EMI IMPROVE

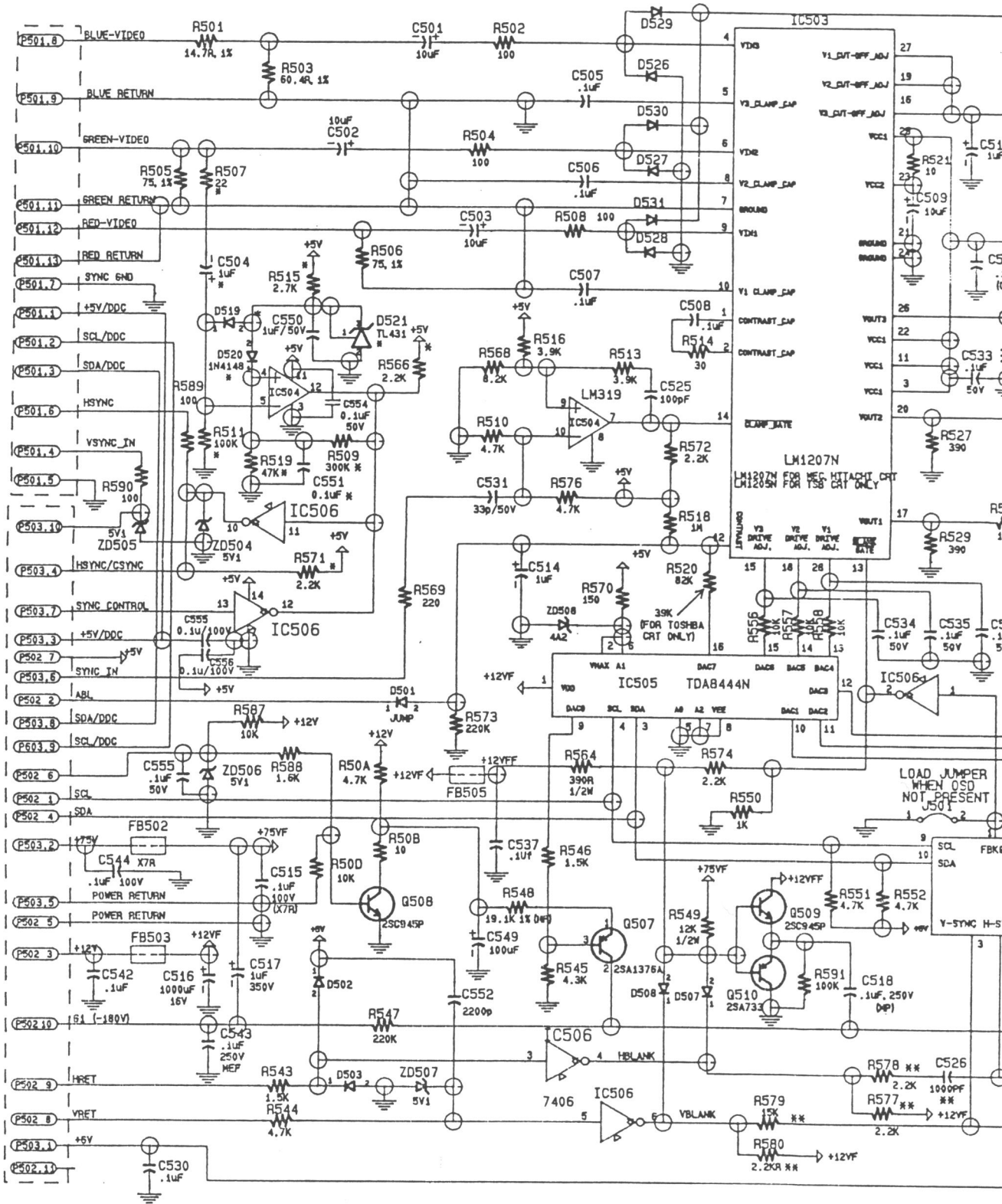
2 RM0-7F10 (D25, C48, L2) NOT INSTALL

	TOSHIBA	MATSUSHITA
R60	1.5R/1W	2R/2W

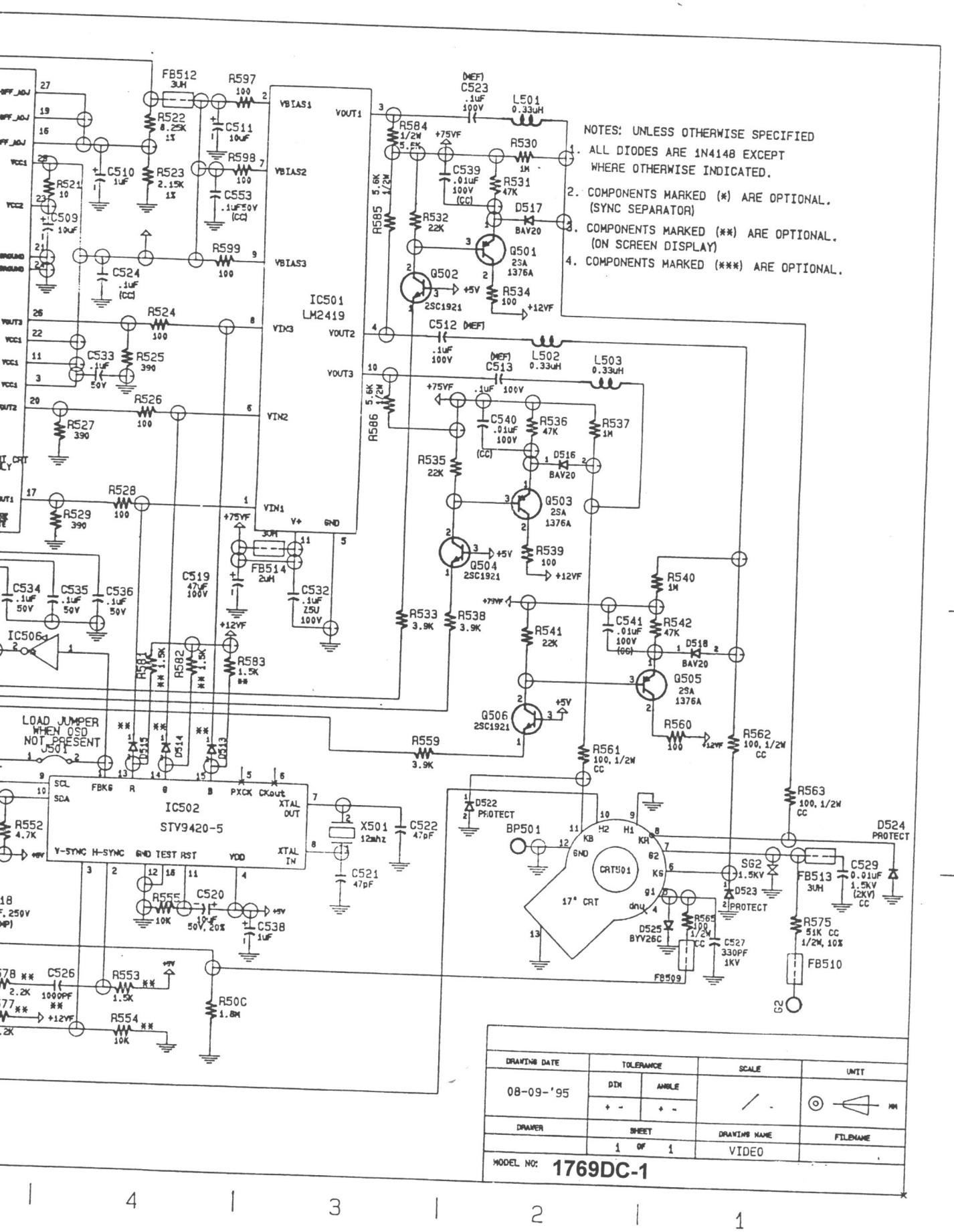
DRAWING DATE	TOLERANCE		SCALE	UNIT
07-27-'95	DIM	ANGLE	/	MM
	+ -	+ -		
DRAWER	SHEET		DRAWING NAME	FILENAME
	1 OF 1		POWER	
MODEL NO.: 1769DC-1				

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13.
GND R GND G GND B GND V H GND SDA SCL +5V/DDC

DATE	ECN/ECO NO.
03-23-'95	N-03099506E6
05-04-'95	N-04189503E6
05-05-'95	0-04189506ET
06-14-'95	0-05159502ET
6-22-'95	0-05229503ET
7-17-'95	0-07079505EP



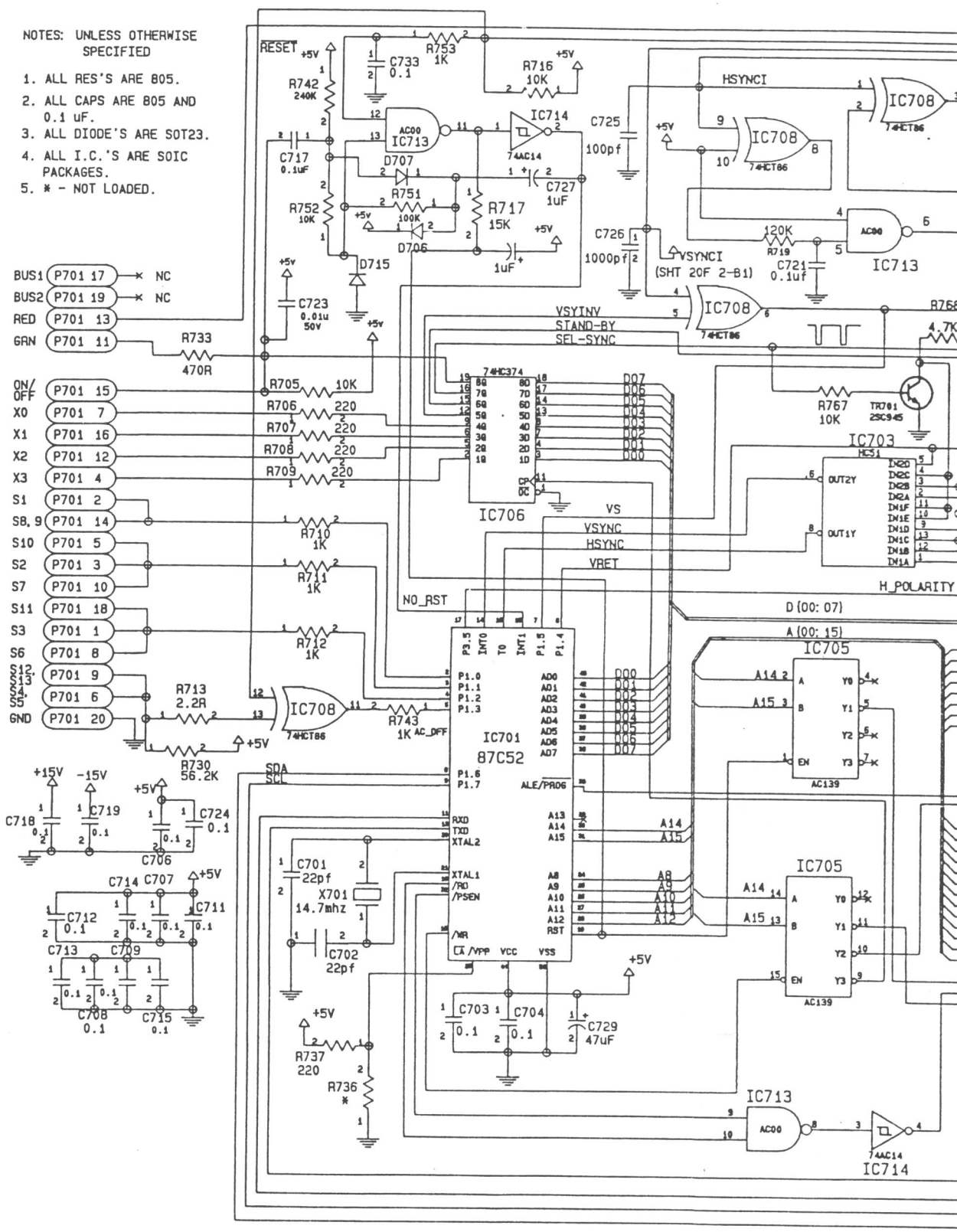
8 | 7 | 6 | 5 |

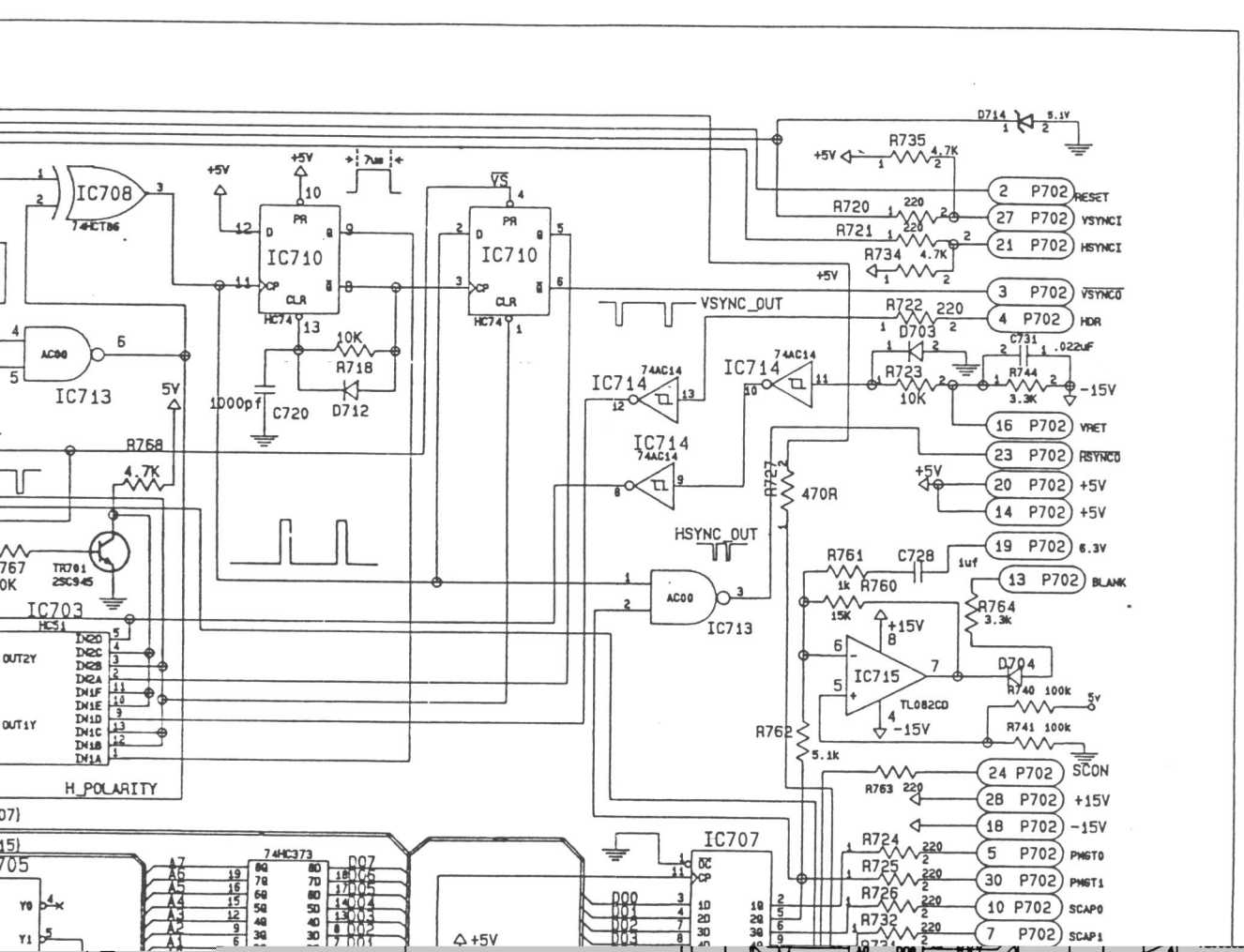

NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL DIODES ARE 1N4148 EXCEPT WHERE OTHERWISE INDICATED.
2. COMPONENTS MARKED (*) ARE OPTIONAL. (SYNC SEPARATOR)
3. COMPONENTS MARKED (**) ARE OPTIONAL. (ON SCREEN DISPLAY)
4. COMPONENTS MARKED (***) ARE OPTIONAL.
IC501 LM2419
IC502 STV9420-5
CRT501 17" CRT
LOAD JUMPER WHEN OSD NOT PRESENT
DRAWING DATE 08-09-'95
TOLERANCE DIM + - ANGLE + -
SCALE
UNIT MM
DRAWER
SHEET 1 OF 1
DRAWING NAME VIDEO
FILENAME
MODEL NO: 1769DC-1

DATE	ECN/ECO NO.
06-14-'95	0-05159504EP
06-29-'95	N-06089503E6

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RES'S ARE 805.
2. ALL CAPS ARE 805 AND 0.1 uF.
3. ALL DIODE'S ARE SOT23.
4. ALL I.C.'S ARE SOIC PACKAGES.
5. * - NOT LOADED.



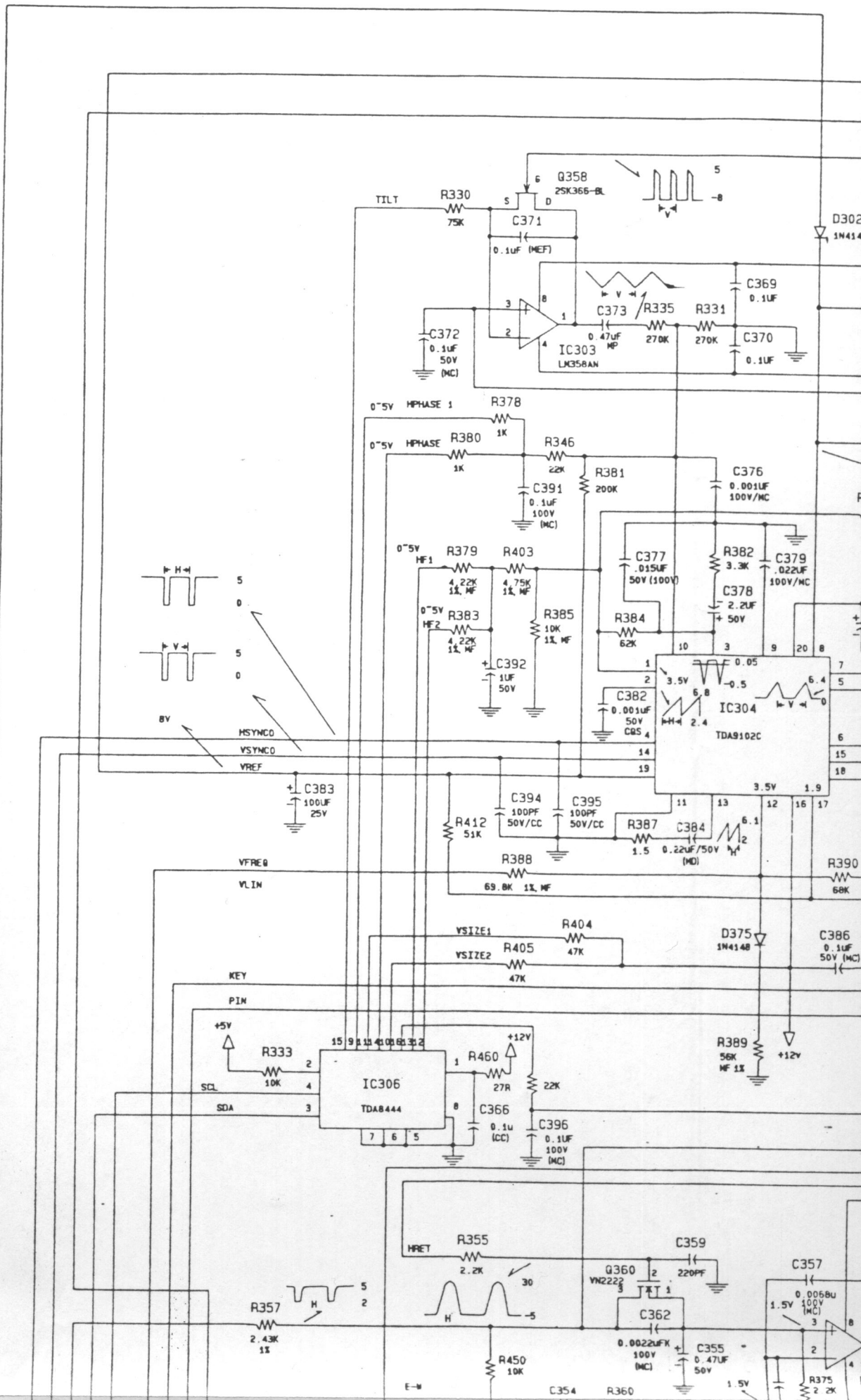


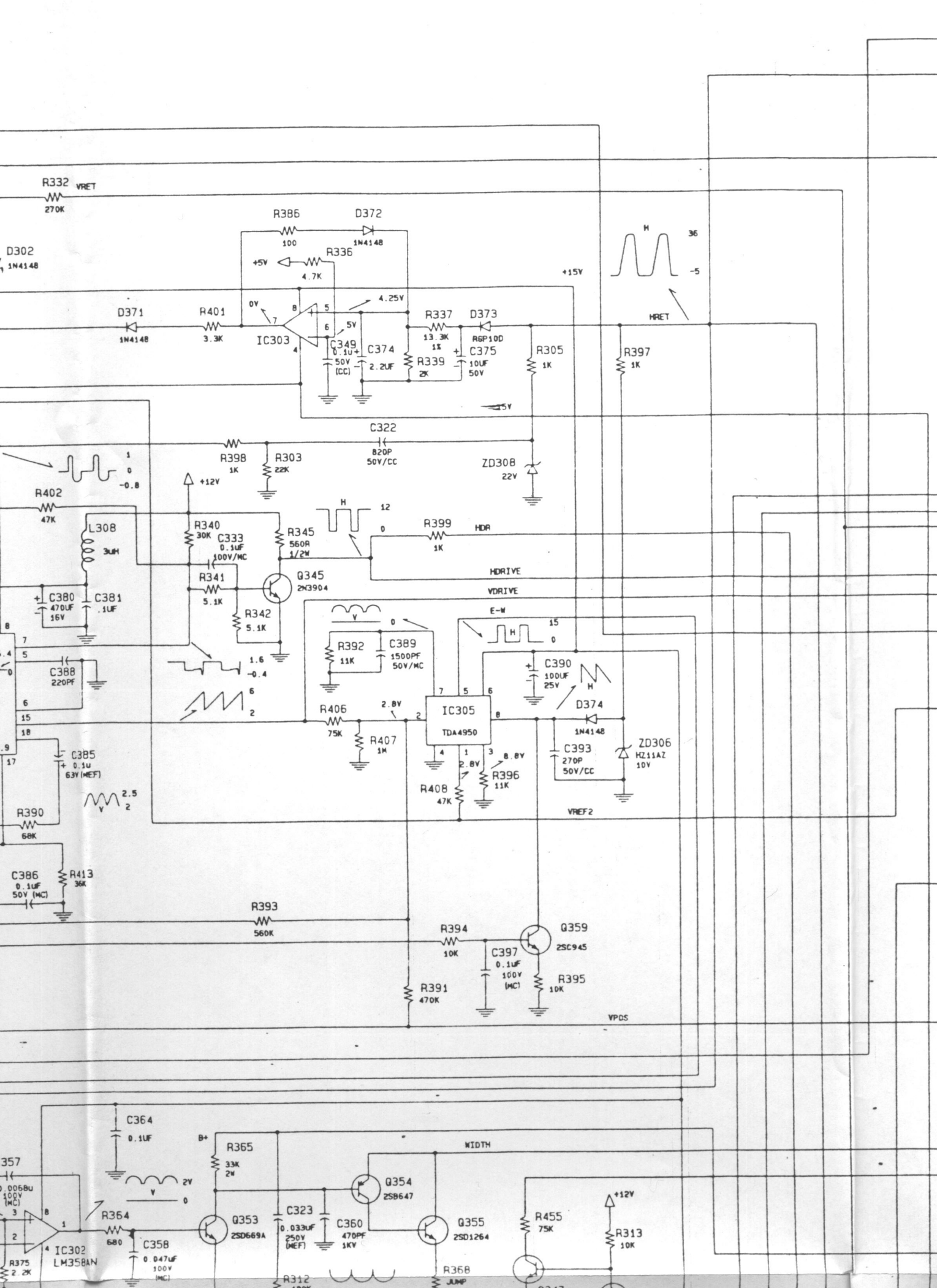
TOLERANCE		SCALE	UNIT
DIM	ANGLE	/	MM
+ -	+ -		
SHEET		DRAWING NAME	FILENAME
1 OF 1		LOGIC	

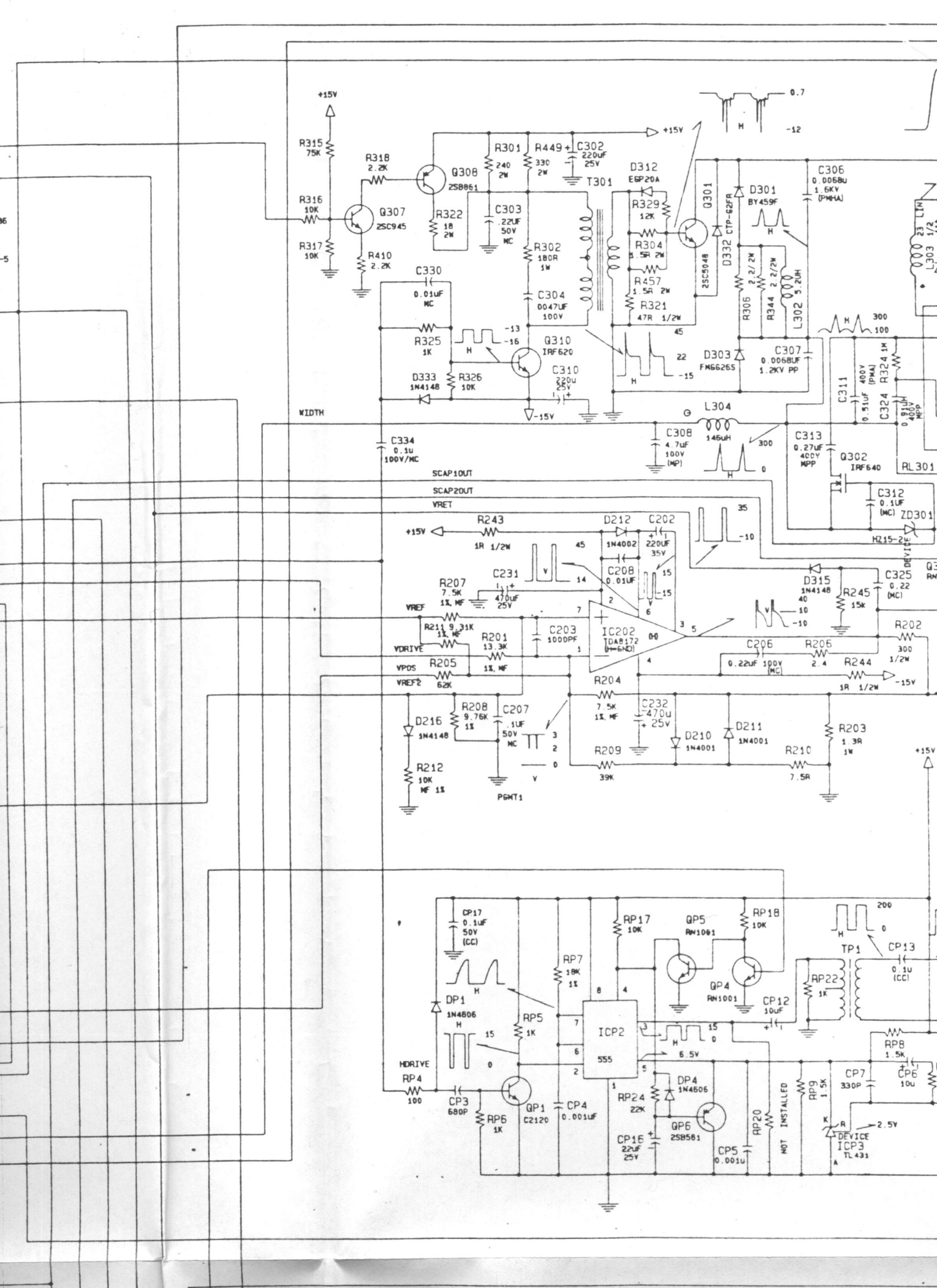
DDC-1

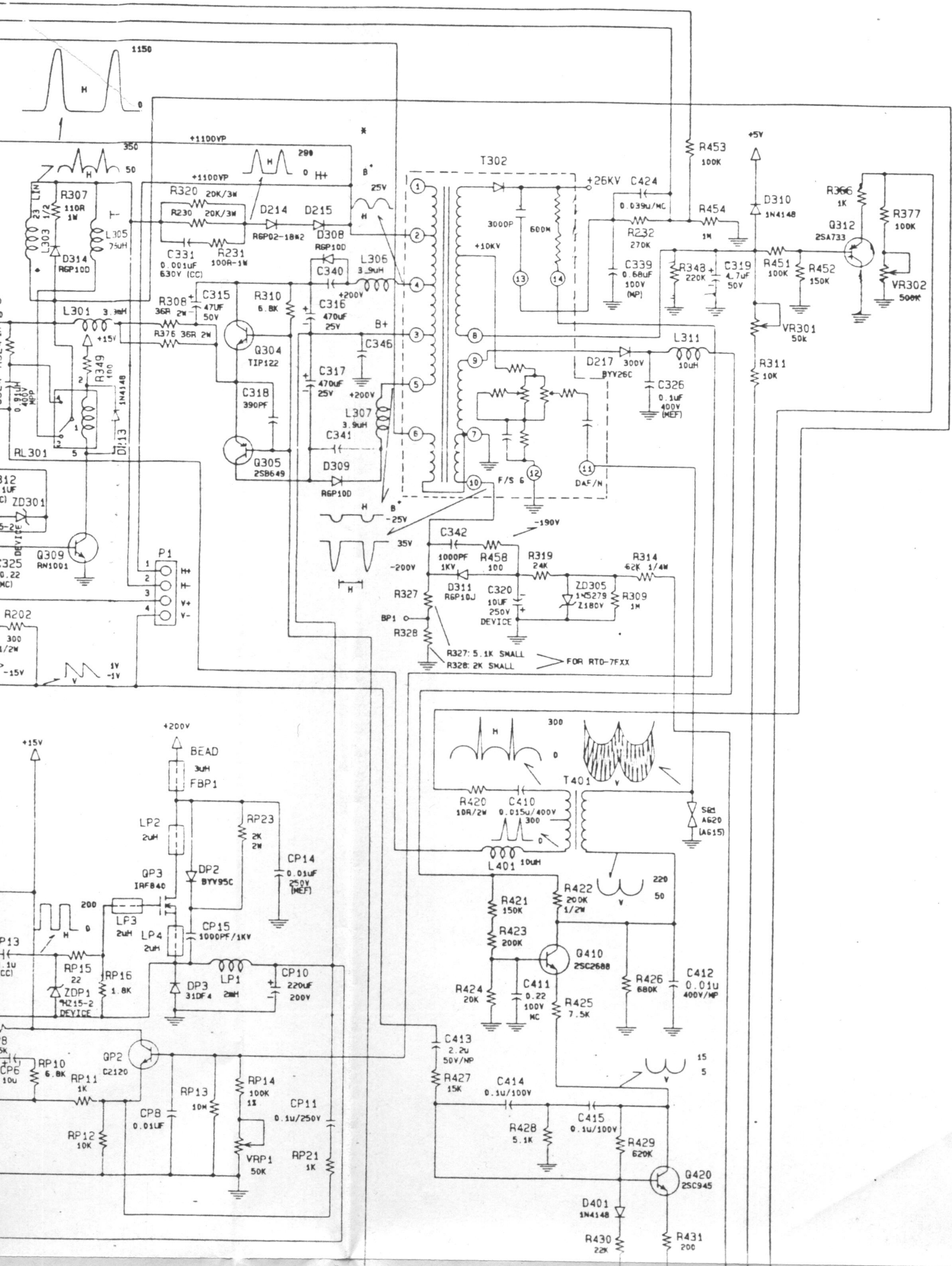
DRAWING DATE	
08-08-'95	
DRAWER	
MODEL NO:	1769

5-03-'95	0-04189507ET
5-03-'95	N-04189503EG
5-05-'95	0-04189506ET
5-14-'95	0-05159502ET
5-14-'95	N-05159509EG
6-22-'95	0-05299507EC
6-22-'95	0-05299503ET
6-23-'95	N-05299503ES
7-11-'95	0-06239503ET
7-25-'95	0-07249504ET
7-25-'95	0-07249505ET
7-25-'95	0-07249506RT
7-31-'95	0-07269507ET
8-02-'95	0-07159502ET

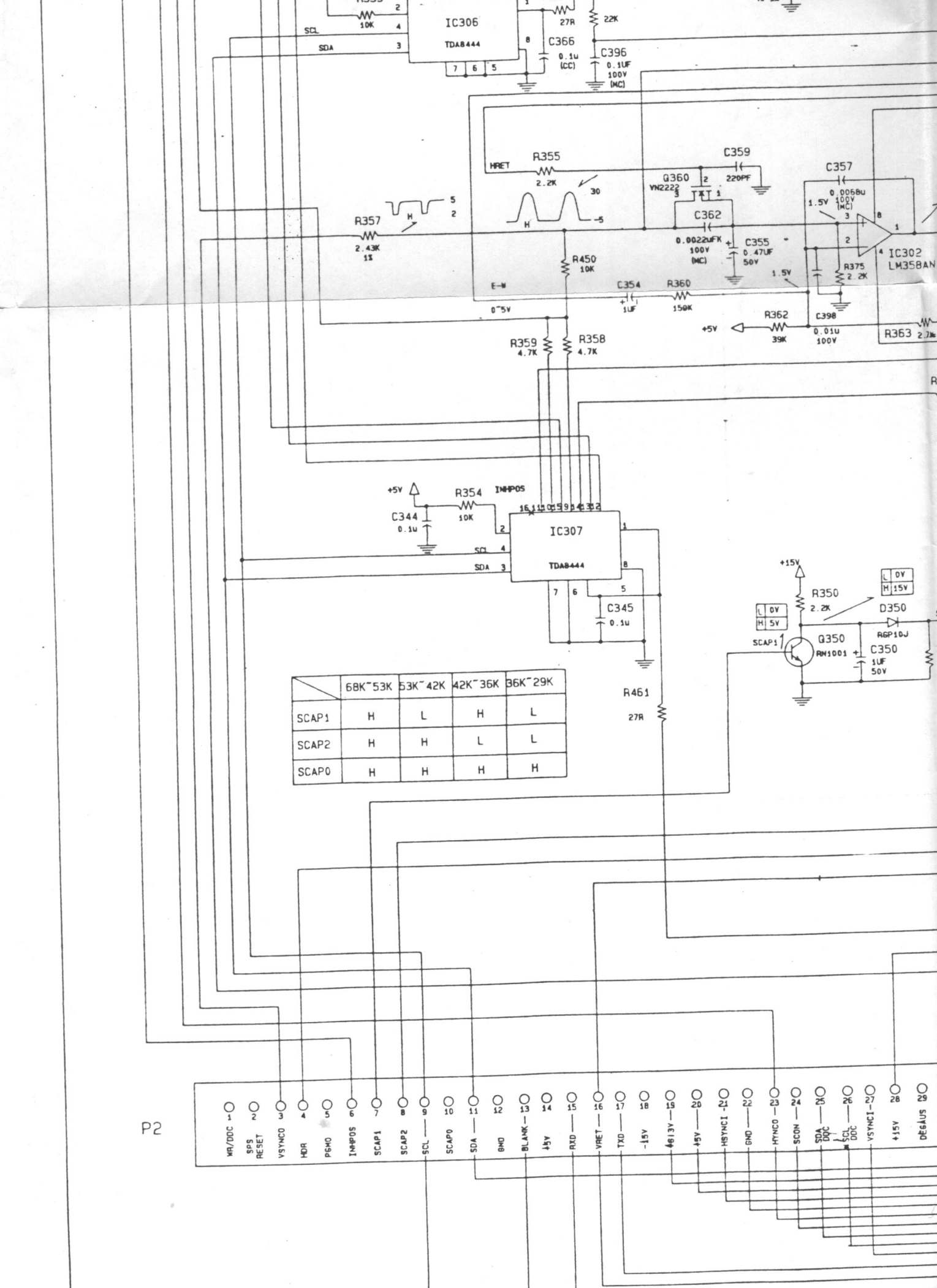



R332 VRET
270K
R386
100
D372
1N4148
R336
4.7K
+5V
+15V
D302
1N4148
D371
1N4148
R401
3.3K
IC303
4.25V
5V
R337
13.3K
1%
D373
RGP10D
HRET
C349
0.1U
50V
(CC)
C374
2.2UF
R339
2K
C375
10UF
50V
R305
1K
R397
1K
-15V
C322
820P
50V/CC
R398
1K
R303
22K
ZD308
22V
+12V
R402
47K
L308
3uH
R340
30K
C333
0.1UF
100V/MC
R345
560R
1/2W
R399
1K
HDR
HDRIVE
VDRIVE
R341
5.1K
Q345
2N3904
R342
5.1K
E-W
C380
470UF
16V
C381
.1UF
C388
220PF
R392
11K
C389
1500PF
50V/MC
C390
100UF
25V
R406
75K
2.8V
IC305
TDA4950
D374
1N4148
R407
1M
C393
270P
50V/CC
ZD306
HZ11AZ
10V
R408
47K
R396
11K
8.8V
VREF2
C385
0.1u
63V(MEF)
R390
68K
C386
0.1uF
50V (MC)
R413
36K
R393
560K
R394
10K
Q359
2SC945
C397
0.1uF
100V
(MC)
R395
10K
R391
470K
VPOS
C364
0.1UF
B+
R365
33K
2W
WIDTH
Q354
2SB647
R364
680
Q353
2SD669A
C323
0.033uF
250V
(MEF)
C360
470PF
1KV
Q355
2SD1264
R455
75K
+12V
R313
10K
C358
0.047uF
100V
(MC)
IC302
LM358AN
R375
2.2K
R368
JUMP
R312

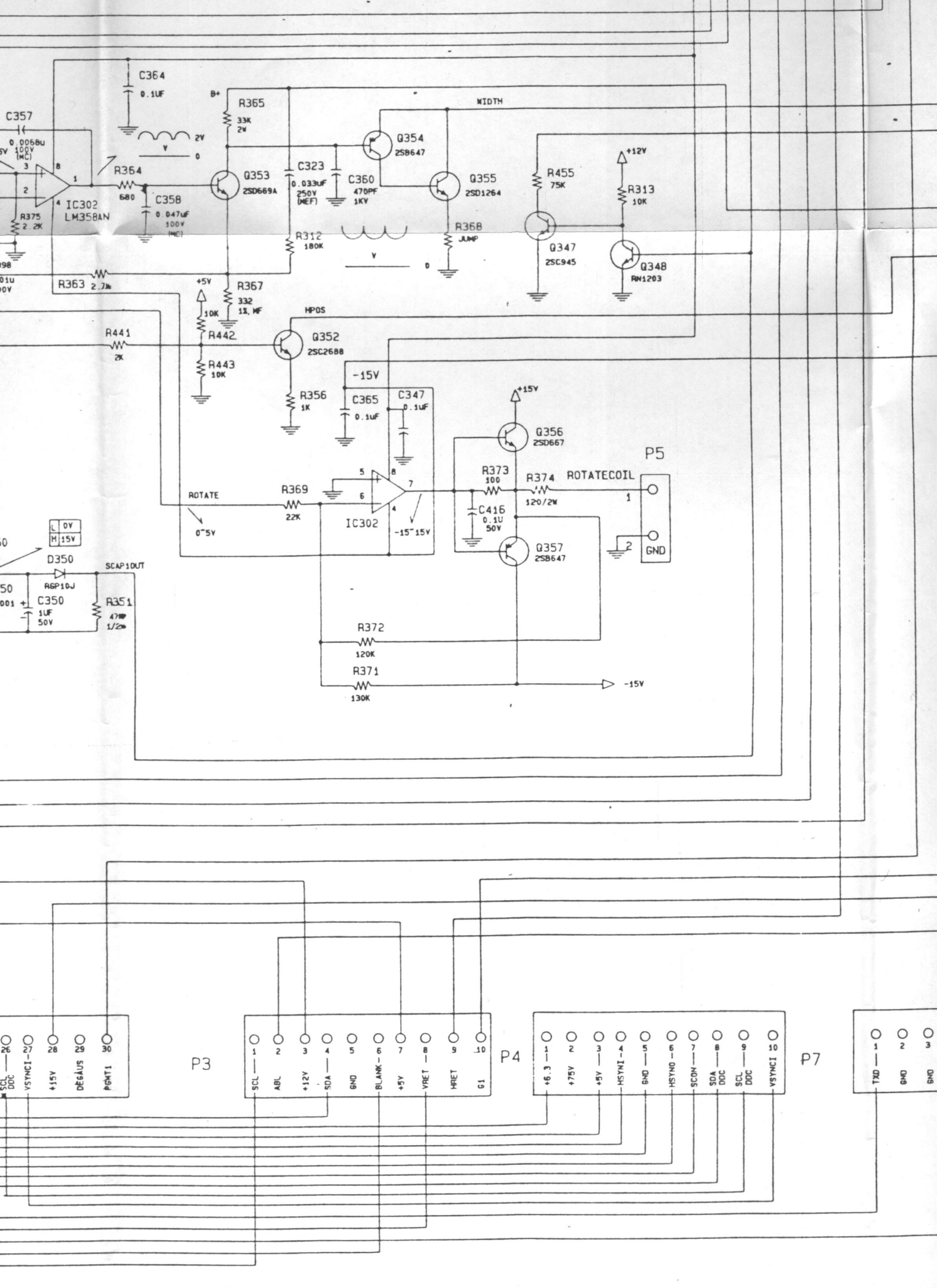

+15V
R315 75K
R318 2.2K
Q308 2SB861
R301 240 2W
R449 330 2W
C302 220uF 25V
T301
D312 EGP20A
C306 0.0068u 1.6KV (PMHA)
R316 10K
Q307 2SC945
R322 18 2W
C303 .22UF 50V MC
R329 12K
Q301
D301 BY459F
D332 CTP-62FR
R317 10K
R410 2.2K
R302 180R 1W
R304 1.5R 2W
R457 1.5R 2W
R321 47R 1/2W
2SC5048
R306 2.2/2W
R344 2.2/2W
L302 5.20uH
C330 0.01uF MC
C304 0047UF 100V
R325 1K
Q310 IRF620
D303 FM6626S
C307 0.0068UF 1.2KV PP
C311 0.51uF 400V (PMA)
R324 1M
C324 0.91uH 400V MPP
D333 1N4148
R326 10K
C310 220u 25V
-15V
WIDTH
L304 146uH
C308 4.7uF 100V (MP)
C313 0.27uF 400V MPP
Q302 IRF640
RL301
C334 0.1u 100V/MC
SCAP1OUT
SCAP2OUT
VRET
R243 1R 1/2W
D212 1N4002
C202 220UF 35V
ZD301 HZ15-2
C231 470uF 25V
C208 0.01UF
D315 1N4148
C325 0.22 (MC)
R245 15k
R207 7.5K 1% MF
VREF
R211 9.31K 1% MF
VDRIVE
R201 13.3K 1% MF
C203 1000PF
IC202 TDA8172
R202 300 1/2W
C206 0.22uF 100V (MC)
R206 2.4
R244 1R 1/2W
VPOS
R205 62K
VREF2
R204 7.5K 1% MF
C232 470u 25V
D216 1N4148
R208 9.76K 1%
C207 .1UF 50V MC
D210 1N4001
D211 1N4001
R203 1.3R 1W
R209 39K
R210 7.5R
R212 10K MF 1%
PGMT1
CP17 0.1uF 50V (CC)
RP17 10K
QP5 RN1001
RP18 10K
TP1
CP13 0.1u (CC)
RP7 18K 1%
QP4 RN1001
CP12 10uF
RP22 1K
DP1 1N4606
RP5 1K
ICP2 555
RP8 1.5K
HDRIVE
RP4 100
CP3 680P
QP1 C2120
CP4 0.001uF
RP24 22K
DP4 1N4606
QP6 2SB561
CP16 22uF 25V
CP5 0.001u
RP20
NOT INSTALLED
RP9 1.5K
CP7 330P
CP6 10u
2.5V
DEVICE ICP3 TL431

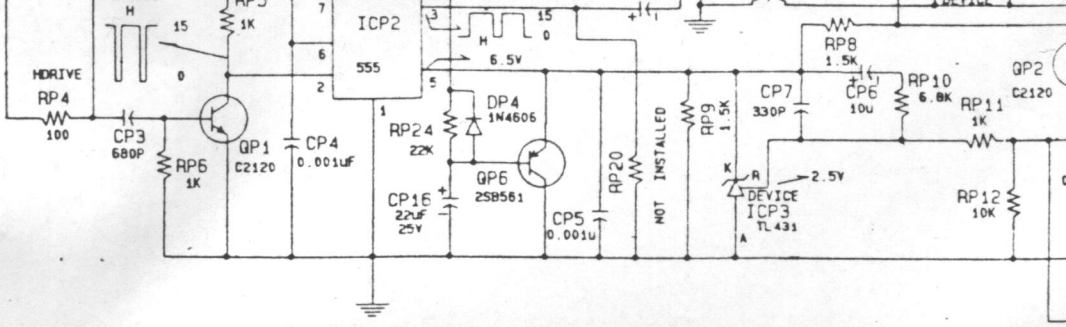


1150
+1100VP
+1100VP
350
50
280
H+
B+
25V
R307
110R 1W
L303
D314
R6P10D
L305
75uH
R320 20K/3W
R230 20K/3W
D214
D215
D308
R6P02-18x2
R6P10D
C331
0.001uF
630V (CC)
R231
100R-1W
L306
3.9uH
C340
+200V
L301 3.3mH
+15V
R308 36R 2W
R376 36R 2W
C315
47UF
50V
R310
6.8K
C316
470uF
25V
B+
C346
Q304
TIP122
R349
100
1N4148
C317
470uF
25V
+200V
C318
390PF
L307
3.9uH
C341
Q305
2SB649
D309
R6P10D
RL301
ZD301
DEVICE
Q309
RN1001
P1
H+
H-
V+
V-
R202
300
-15V
1V
-1V
T302
+26KV
C424
0.039u/MC
3000P
600M
+10KV
R232
270K
R454
1M
R453
100K
C339
0.68uF
100V
(MP)
R348
220K
C319
4.7uF
50V
+5V
D310
1N4148
R451
100K
R452
150K
R366
1K
R377
100K
Q312
2SA733
VR302
500K
VR301
50k
R311
10K
L311
10uH
D217
BYV26C
300V
C326
0.1uF
400V
(MEF)
F/S 6
DAF/N
-25V
35V
-200V
-190V
C342
1000PF
1KV
R458
100
R319
24K
R314
62K 1/4W
D311
R6P10J
C320
10UF
250V
DEVICE
ZD305
1N5279
Z180V
R309
1M
R327
BP1
R328
R327: 5.1K SMALL
R328: 2K SMALL
FOR RTD-7FXX
+200V
BEAD
3uH
FBP1
+15V
LP2
2uH
RP23
2K
2W
DP2
BYV95C
CP14
0.01uF
250V
(MEF)
QP3
IRF840
200
LP3
2uH
LP4
2uH
CP15
1000PF/1KV
RP15
22
ZDP1
HZ15-2
DEVICE
RP16
1.8K
DP3
31DF4
LP1
2mH
CP10
220uF
200V
QP2
C2120
RP10
6.8K
CP6
10u
RP11
1K
RP13
10M
RP14
100K
1%
CP11
0.1u/250V
CP8
0.01UF
RP12
10K
VRP1
50K
RP21
1K
300
T401
R420
10R/2W
C410
0.015u/400V
300
SG1
A620
(A615)
L401
10uH
220
50
R421
150K
R422
200K
1/2W
R423
200K
Q410
2SC2688
R424
20K
C411
0.22
100V
MC
R425
7.5K
R426
680K
C412
0.01u
400V/MP
C413
2.2u
50V/NP
R427
15K
15
5
C414
0.1u/100V
C415
0.1u/100V
R428
5.1K
R429
620K
Q420
2SC945
D401
1N4148
R430
22K
R431
200

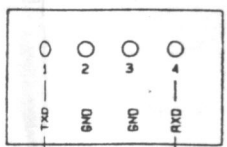


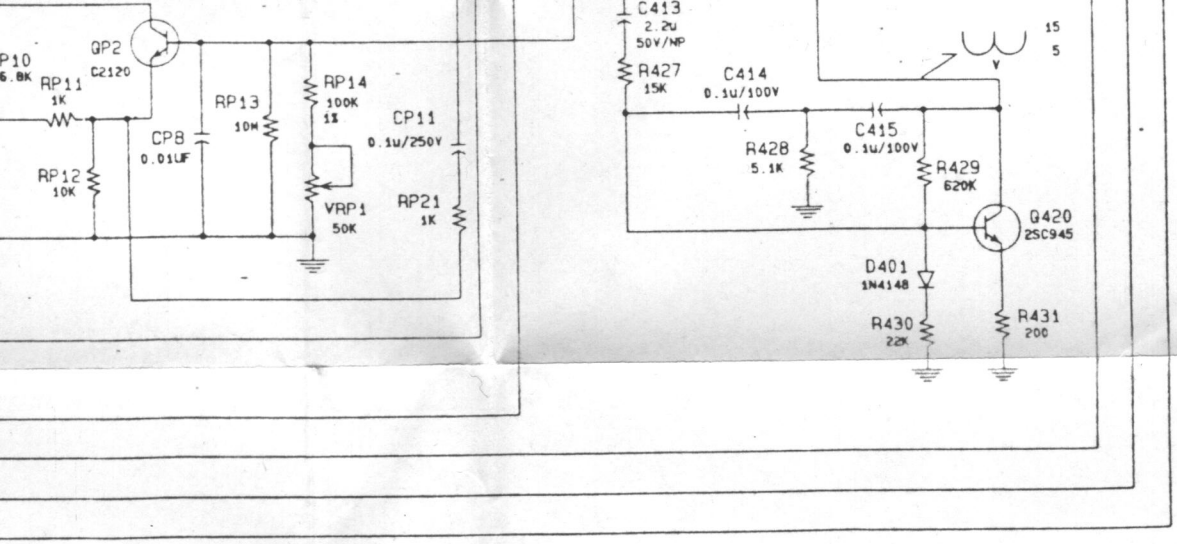
	68K~53K	53K~42K	42K~36K	36K~29K
SCAP1	H	L	H	L
SCAP2	H	H	L	L
SCAP0	H	H	H	H


C364
0.1UF
B+
R365
33K
2W
WIDTH
C357
0.0068U
100V
(MC)
2V
V
0
Q354
2SB647
R364
680
Q353
2SD669A
C323
0.033UF
250V
(MEF)
C360
470PF
1KV
Q355
2SD1264
R455
75K
+12V
R313
10K
IC302
LM358AN
C358
0.047UF
100V
(MC)
R375
2.2K
R312
180K
R368
JUMP
Q347
2SC945
Q348
RN1203
R363
2.7K
+5V
R367
332
1%, MF
10K
R442
HPOS
R441
2K
Q352
2SC2688
R443
10K
-15V
R356
1K
C365
0.1uF
C347
0.1uF
+15V
Q356
2SD667
P5
R373
100
R374
ROTATECOIL
120/2W
ROTATE
R369
22K
IC302
C416
0.1U
50V
0~5V
-15~15V
Q357
2SB647
GND
L 0V
H 15V
D350
SCAP10UT
RGP10J
C350
1UF
50V
R351
R372
120K
R371
130K
-15V
P3
P4
P7
SCL DDC
VSYNCI
+15V
DEGAUS
PGNT1
SCL
ABL
+12V
SDA
GND
BLANK
+5V
VRET
HRET
G1
+6.3
+75V
+5V
HSYNI
GND
HSYNO
SCON
SDA DDC
SCL DDC
VSYNCI
TXD
GND
GND



NAME	TOSHIBA	MATSUSHITA	
R457	1.5R/2W	2R/2W	2
R329	0.47R/2W	0.75R/2W	1
R304	1.5R/2W	2R/2W	1
R390	240K 1/4W	240K 1/4W	2
R307	120R/1W	56R 2W	1
R357	2.7KR MF 1%	2.55K 1%	2
R375	2.1K MF 1%	2KR MF 1%	2
R60	1.5R 1W	2R 2W	1
R231	120R 1/2W	JUMP	1
R450	10KR 1/4 W	9.1KR	9
R210			
C311	0.51uF/400V	0.47UF/400V	0
C313			0
C324	0.27UF/400V MPP	0.18UF/400V MPP	0
J35 J143	DEL	DEL	A
J35 J142	ADD 5406100000	ADD 5406100000	A
L303	LINEARITY 708S206301	LINEARITY 708S2014T1	L
L305	1uF/400V MPP	1uF/400V MPP	0
L303	23 LINE	22T	2





	HITACHI
	2R/2W
	1R/2W
	1.5R/2W
	240K
	110R 1W
	2.43K 1/4W MF 1%
	2.1KR MF 1%
	1.5R 1W
	100R 1W
	9.1KR
	51R
	0.47uF/400v
	0.24uF/400v
	0.82uF/400V
	ADD 5406100000
	ADD 5406100000
014T1	LINEARITY 708S2063010
	0.91uF/400V MPP
	23 LINE

DRAWING DATE	TOLERANCE		SCALE	UNIT
08-02-'95	DIM	ANGLE	/	MM
	+	−		
DRAWER	SHEET		DRAWING NAME	FILE NAME
	1 OF 1		DEF	

MODLE NO. **1769DC-1**

Section 8.
Mechanical Parts

8.1. Exploded View

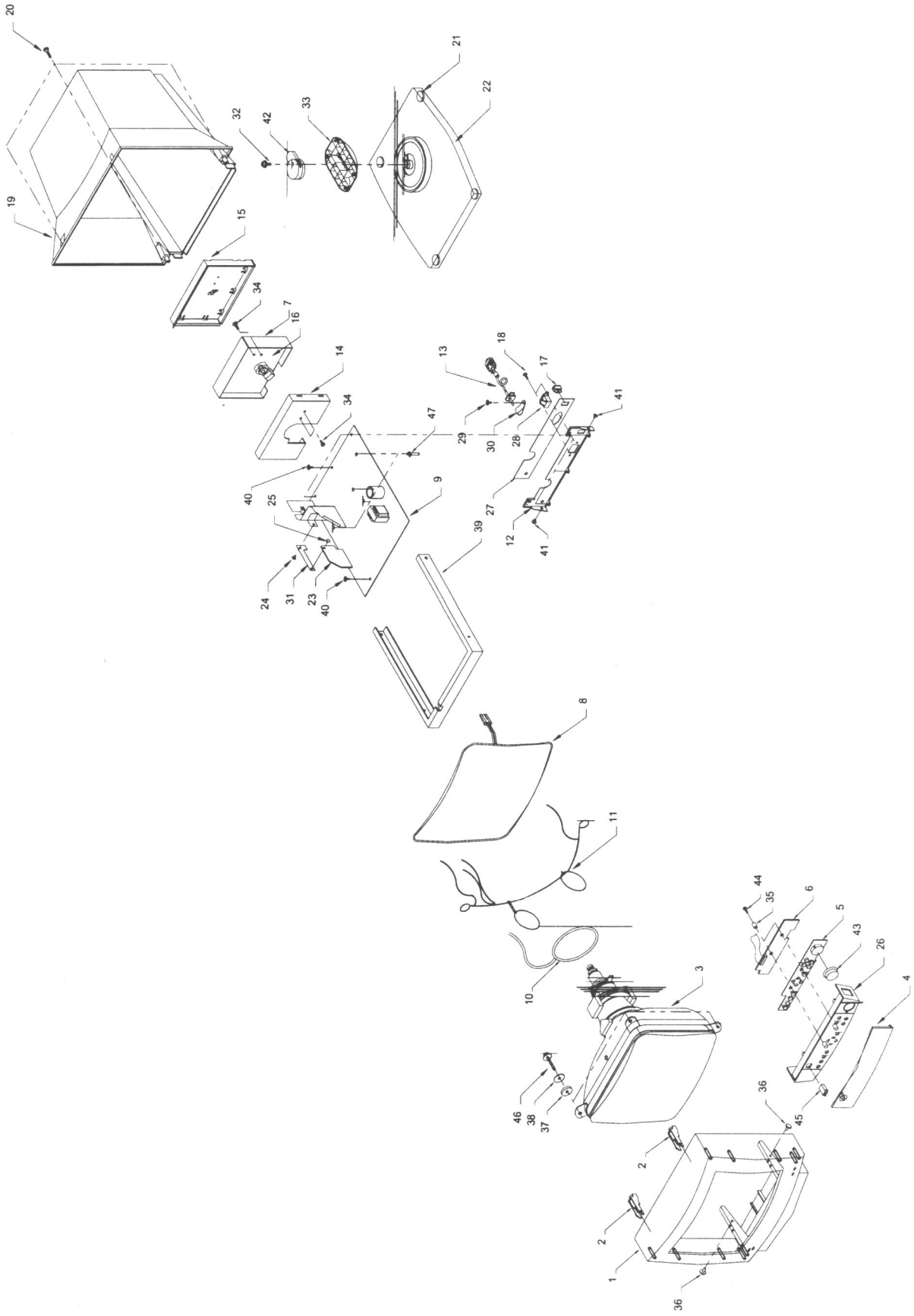


Figure 8-1 Exploded View

8.2. Key to Exploded View

REF.	PART NO.	DESCRIPTION
1	1301017F10	BEZEL
2	1376017F10	BEZEL BRACKET
3	7010019417	CRT M34KDD50X16(SVK)MACH C460449010
4	1340017F10	DOOR
5	9005097F10	FUNCTION KEY
6	SS7F100920	CONTROL PCB ASS'Y
7	2009097F10	NECK SHIELD
8	7020177F10	DEGAUSSING COIL
9	RO7F115044-V1	MAIN PCB ASS'Y
10	C460670110	TILT RING WIRE ASS'Y 270mm
11	C001137F11	CRT BRIND WIRE ASS'Y
12	2002097F10	CHASSIS REAR
13	C7107F1020	I/O CABLE ASS'Y
14	2007097F10	NECK SHIELD(FRONT)
15	2009097F10	NECK SHIELD(BACK)
16	RO7F100244-V1	NECK PCB ASS'Y
17	4410304020	POWER SWITCH SJ-W2F4A-07BB
18	8024113008	SCREW STEEL TRI 'B' TAPPING
19	1302017F10	BUCKET
20	8433113520	SCREW B/HD M4X16 TAPPING 'P' FOR BUCKET & BEZEL ASS'YX2
21	1010094310	FOOT
22	1605017F10	BASE
23	SS7F100630-404	LOGIC PCB ASS'Y
24	3060040060	RIVET NYLON 4.0X6.0 FOR FBT COVER & FIXED PLATE
25	1013094180	REVLT +3 FOR LOGIC PCB & FIXED PLATE
26	1121017F10	CONTROL PANEL
27	9004097F10	DECO PLATE(I/O CABLE)
28	7067F10122	LINE FILTER IX-0342-S
29	8121144008	SCREW CAP 'C' M4X8 FOR I/O CABLE
30	2017094030	CLIP CABLE FOR I/O CABLE
31	2010191530	FIXED PLATE
32	8135115025	SCREW CAP HI-LOW TAPPING M5X25
33	1604017F10	TILT BALL
34	8026113008	SCREW BIND(+) ZINC M3X8
35	36023000U5	NYLON WASHER(U-5)
36	3662300SR4	PLASTIC PUSH RIVETS SR-4
37	3100452015	RUBBER WASHER 4.5X20X1.5T
38	3111502016	FLAT WASHER M5 T=1.6
39	2001097F10	U BRACKET
40	8026113008	SCREW BIND(+) ZINC M3X8 TAPPING FOR U-BKT & MAIN PCBX4
41	8127113006	SCREW PAN(+)/HD CAP YAPPING M3X6

42	1A100C7F10	RETAINER
43	1360014E10	CAP
44	8418113008	SCREW BIND(+) TAPPING M3X8
45	1015094610	DOOR LOCK 4U66
46	8135115025	SCREW CAP HI-LOW TAPPING
47	36523BS22P	PCB SUPPORT
	ADDITIONAL MECHANICAL PARTS NOT SHOWN IN EXPLODED VIEW	
	1410004E10	LENS
	361231503H	LOCK CAP
	4050256455	RES-CF 1/2W J 560K
	5290003000	TUBE-SHRINK ID=3
	5290005000	TUBE-SHRINK ID=5
	5541025095	CABLE TIE 2.5X90
	5541025160	CABLE TIE-BINDING 2.5X160
	5541036200	CABLE TIE W=3.6mm L=200mm
	C459425101	GND WIRE ASS'Y 130mm GRN/YEL
	C4597F1010	GND WIRE ASS'Y
	C4597F1020	GND WIRE ASS'Y 100mm
	C4607F1010	WIRE ASS'Y 100mm

REF.	PART NO.	DESCRIPTION
X501	7150120000	X'TAL 12MHZ
ZD504	41205005C1	DIODE ZENER HZ5C1 5.1V -AT-
ZD505	41205005C1	DIODE ZENER HZ5C1 5.1V -AT-
ZD506	41205005C1	DIODE ZENER HZ5C1 5.1V -AT-
ZD507	41205005C1	DIODE ZENER HZ5C1 5.1V -AT-
ZD508	41205004A2	DIODE ZENER HZ4A2 -AT-

9.4. Logic Board

REF.	PART NO.	DESCRIPTION
	SS7F100630 -404	LOGIC PCB ASS'Y
	4141109100	#P.C.B. LOGIC
	41597F1002	FIRMWARE 7F10 REV:2.0
C701	7183220556	CAP-COG 22PFJ 50V CHIP 0805
C702	7183220556	CAP-COG 22PFJ 50V CHIP 0805
C703	7146104456	CAP-Y5V 0.1UFZ 50V CHIP 0805
C704	7146104456	CAP-Y5V 0.1UFZ 50V CHIP 0805
C706	7146104456	CAP-Y5V 0.1UFZ 50V CHIP 0805
C707	7146104456	CAP-Y5V 0.1UFZ 50V CHIP 0805
C708	7146104456	CAP-Y5V 0.1UFZ 50V CHIP 0805
C709	7146104456	CAP-Y5V 0.1UFZ 50V CHIP 0805
C711	7146104456	CAP-Y5V 0.1UFZ 50V CHIP 0805
C712	7146104456	CAP-Y5V 0.1UFZ 50V CHIP 0805
C713	7146104456	CAP-Y5V 0.1UFZ 50V CHIP 0805
C714	7146104456	CAP-Y5V 0.1UFZ 50V CHIP 0805
C715	7146104456	CAP-Y5V 0.1UFZ 50V CHIP 0805
C717	7146104456	CAP-Y5V 0.1UFZ 50V CHIP 0805
C718	7146104456	CAP-Y5V 0.1UFZ 50V CHIP 0805
C719	7146104456	CAP-Y5V 0.1UFZ 50V CHIP 0805
C720	7183102556	CAP-COG 1000PFJ 50V CHIP 0805
C721	7146104456	CAP-Y5V 0.1UFZ 50V CHIP 0805
C722	5156109T50	CAP-EC6 1UFM 50V -RT-
C723	7146103456	CAP-Y5V 0.01UFZ 50V CHIP 0805
C724	7146104456	CAP-Y5V 0.1UFZ 50V CHIP 0805
C725	7183101556	CAP-COG 100PFJ 50V CHIP 0805
C726	7183102556	CAP-COG 1000PFJ 50V CHIP 0805
C727	5156109T50	CAP-EC6 1UFM 50V -RT-
C728	5156109T50	CAP-EC6 1UFM 50V -RT-
C729	5156470T16	CAP-EC6 47UFM 16V -RT-
C730	5156470T16	CAP-EC6 47UFM 16V -RT-
C731	7144223156	CAP-X7R 0.022UFK 50V CHIP 0805
C732	7146104456	CAP-Y5V 0.1UFZ 50V CHIP 0805
C733	7146104456	CAP-Y5V 0.1UFZ 50V CHIP 0805
D701	412014148T	DIODE 1N4148 (BAS32L) MLF SMD
D702	412014148T	DIODE 1N4148 (BAS32L) MLF SMD
D703	412014148T	DIODE 1N4148 (BAS32L) MLF SMD
D704	412014148T	DIODE 1N4148 (BAS32L) MLF SMD
D706	412014148T	DIODE 1N4148 (BAS32L) MLF SMD
D707	412014148T	DIODE 1N4148 (BAS32L) MLF SMD
D708	412014148T	DIODE 1N4148 (BAS32L) MLF SMD
D709	412014148T	DIODE 1N4148 (BAS32L) MLF SMD
D710	412014148T	DIODE 1N4148 (BAS32L) MLF SMD
D711	412014148T	DIODE 1N4148 (BAS32L) MLF SMD
D712	412014148T	DIODE 1N4148 (BAS32L) MLF SMD
D713	412050051T	DIODE ZENER 5.1V +-5% MLF SMD
D714	412050051T	DIODE ZENER 5.1V +-5% MLF SMD
D715	412014148T	DIODE 1N4148 (BAS32L) MLF SMD

REF.	PART NO.	DESCRIPTION
IC701	415980C52T	IC 80C52 V3.5 16MHZ PLCC 44PIN
IC702	415928C64T	IC 28C64 CHIP PLCC 32PIN
IC703	415507451T	IC 74HC51 SMD CHIP 14PIN
IC704	415574373T	IC 74HC373 SMD CHIP 20PIN
IC705	415A74139T	IC 74AC139 SMD 16PIN
IC706	415574374T	IC 74HC374 SMD CHIP 20PIN
IC707	415574374T	IC 74HC374 SMD CHIP 20PIN
IC708	415707486T	IC 74HCT86 SMD CHIP 14PIN
IC710	415507474T	IC 74HC74 SMD CHIP 14PIN
IC713	415A07400T	IC 74AC00 SMD 14PIN
IC714	415A07414T	IC 74AC14 SMD 14PIN
IC715	415908200T	IC TL082-CD SMD 8PIN
IC716	415924210T	IC 24LC21 (SOIC) 8PIN
P701	4492025420	CONN. 20P TOP LT-P25420
R701	4010110352	RES-CHIP 1/10W J 10K 0805
R702	4010110352	RES-CHIP 1/10W J 10K 0805
R703	4010118252	RES-CHIP 1/10W J 1.8K 0805
R704	4010168252	RES-CHIP 1/10W J 6.8K 0805
R705	4010110352	RES-CHIP 1/10W J 10K 0805
R706	4010122152	RES-CHIP 1/10W J 220R 0805
R707	4010122152	RES-CHIP 1/10W J 220R 0805
R708	4010122152	RES-CHIP 1/10W J 220R 0805
R709	4010122152	RES-CHIP 1/10W J 220R 0805
R710	4010110252	RES-CHIP 1/10W J 1K 0805
R711	4010110252	RES-CHIP 1/10W J 1K 0805
R712	4010110252	RES-CHIP 1/10W J 1K 0805
R713	4010110252	RES-CHIP 1/10W J 1K 0805
R714	4010122152	RES-CHIP 1/10W J 220R 0805
R715	4010122152	RES-CHIP 1/10W J 220R 0805
R716	4010110352	RES-CHIP 1/10W J 10K 0805
R717	4010115352	RES-CHIP 1/10W J 15K 0805
R718	4010110352	RES-CHIP 1/10W J 10K 0805
R719	4010112452	RES-CHIP 1/10W J 120K 0805 -AT
R720	4010122152	RES-CHIP 1/10W J 220R 0805
R721	4010122152	RES-CHIP 1/10W J 220R 0805
R722	4010122152	RES-CHIP 1/10W J 220R 0805
R723	4010110352	RES-CHIP 1/10W J 10K 0805
R724	4010122152	RES-CHIP 1/10W J 220R 0805
R725	4010122152	RES-CHIP 1/10W J 220R 0805
R726	4010122152	RES-CHIP 1/10W J 220R 0805
R727	4010147152	RES-CHIP 1/10W J 470R 0805
R729	4010122152	RES-CHIP 1/10W J 220R 0805
R730	4010110352	RES-CHIP 1/10W J 10K 0805
R731	4010122152	RES-CHIP 1/10W J 220R 0805
R732	4010122152	RES-CHIP 1/10W J 220R 0805
R733	4010147152	RES-CHIP 1/10W J 470R 0805
R734	4010147252	RES-CHIP 1/10W J 4.7K 0805
R735	4010147252	RES-CHIP 1/10W J 4.7K 0805
R737	4010122152	RES-CHIP 1/10W J 220R 0805
R738	4010110252	RES-CHIP 1/10W J 1K 0805
R740	4010110452	RES-CHIP 1/10W J 100K 0805
R741	4010110452	RES-CHIP 1/10W J 100K 0805
R742	4010124452	RES-CHIP 1/10W J 240K 0805 -AT
R743	4010110252	RES-CHIP 1/10W J 1K 0805
R744	4010133252	RES-CHIP 1/10W J 3.3K
R745	4010122252	RES-CHIP 1/10W J 2.2K 0805
R746	4010110252	RES-CHIP 1/10W J 1K 0805
R747	4010110252	RES-CHIP 1/10W J 1K 0805
R748	4010147052	RES-CHIP 1/10W J 47R 0805
R749	4010147252	RES-CHIP 1/10W J 4.7K 0805

REF.	PART NO.	DESCRIPTION
R751	4010110452	RES-CHIP 1/10W J 100K 0805
R752	4010110352	RES-CHIP 1/10W J 10K 0805
R753	4010110252	RES-CHIP 1/10W J 1K 0805
R760	4010115352	RES-CHIP 1/10W J 15K 0805
R761	4010110252	RES-CHIP 1/10W J 1K 0805
R762	4010151252	RES-CHIP 1/10W J 5.1K 0805
R763	4010122152	RES-CHIP 1/10W J 220R 0805
R764	4010133252	RES-CHIP 1/10W J 3.3K
R765	4010122152	RES-CHIP 1/10W J 220R 0805
X701	7151474563	CRYSTAL 14.7456MHZ

9.5. Control Panel PCB Assembly

REF.	PART NO.	DESCRIPTION
	SS7F100920-404	CONTROL PCB ASS'Y
	4120600237	LED ROHM SLM-23VMW R/G CHIP SO FOR CONTROL PCB
	4141109300	#P.C.B. CONTROL
	C488201021	CONN. 20P & WIRE W/CORE ASS'Y

REF.	PART NO.	DESCRIPTION
RP8	4050515255	RES-CF 1/4W J 1.5K SMALL -AT-
RP9	4050515255	RES-CF 1/4W J 1.5K SMALL -AT-
SK1	4490300190	CONN. 3.96 3P W/O PIN 2 -SF-
SK2	4490200207	CONN. 2P WAFER ROUND PIN 10MM
T1	7066330253	CHOKE COMMON MODE
T3	7050107F10	POWER TRANSFORMER
T301	7050207F10	DRIVER TRANSFORMER
T401	7050519000	FOCUS TRANSFORMER
TP1	705025423L	DRIVER TRANSFORMER
VR1	5225150210	POT(CERMET) 0.3W 5K 6+ LAY-DOW
VR301	5225150310	POT(CERMET) 0.3W 50K 6+ LAY-DO
VR302	5225150410	POT(CERMET) 0.3W 500K 6+ LAY-D
VRP1	5225150310	POT(CERMET) 0.3W 50K 6+ LAY-DO
ZD1	4120502402	DIODE ZENER 1/2W 24V HZ24-2 -A
ZD2	4120500152	DIODE ZENER 14.5-15.1V -AT-
ZD3	4120512B20	DIODE ZENER 12V HZ12B2 -AT-
ZD301	4120500152	DIODE ZENER 14.5-15.1V -AT-
ZD303	4120500152	DIODE ZENER 14.5-15.1V -AT-
ZD305	412055279U	DIODE ZENER 1N5279BRL -AT-
ZD306	4120511A20	DIODE ZENER HZ11A2 -AT-
ZD308	4120502200	DIODE ZENER 22V HZ22-1 -AT-
ZD4	4120500B52	DIODE ZENER HZ5B2 -AT-
ZD5	4120518CU	DIODE ZENER MTZJ18C -AT-
ZDP1	4120500152	DIODE ZENER 14.5-15.1V -AT-

9.3. Neck Board

REF.	PART NO.	DESCRIPTION
	P07F10244-V1	NECK PCB ASS'Y
	2009091530	HEAT SINK FOR IC501
	2009097F10	NECK SHIELD
	3011100030	NUT ISO HEX M3 Z1NC FOR IC501
	4141108401	P.C.B VIDEO 136X123mm
	8026113008	SCREW BID(+) ZINC M3X8 TAPPING FOR VIDEO SHIELD (FRONT) & HEAT SINK ASS'Y
	8504113010	SCREW BIND(+) M3X10 MACH W/DIS FOR IC501
BP501	3340230165	BEAD PIN 16.5X2.3+
BP502	3340230165	BEAD PIN 16.5X2.3+
C501	5156100T50	CAP-EC6 10UFM 50V -RT-
C502	5156100T50	CAP-EC6 10UFM 50V -RT-
C503	5156100T50	CAP-EC6 10UFM 50V -RT-
C504	5156109T50	CAP-EC6 1UFM 50V -RT-
C505	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C506	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C507	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C508	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C509	515X100T50	CAP-ECX 10UFM 50V -RT-
C510	515X109T50	CAP-ECX 1UFM 50V -RT-
C511	515X100T50	CAP-ECX 10UFM 50V -RT-
C512	5075104501	CAP-MEF 0.1UFJ 100V CF
C513	5075104501	CAP-MEF 0.1UFJ 100V CF
C514	5156109T50	CAP-EC6 1UFM 50V -RT-
C515	7140104214	CAP-X7R 0.1UFM 100V -RT-
C516	5156102S16	CAP-EC6 1000UFM 16V -SF-
C517	5156109T09	CAP-EC6 1UFM 350V 8+ -RT-
C518	5074104102	CAP-MEF 0.1UFK 250V -SF-
C519	515X470S01	CAP-ECX 47UFM 100V -SF-
C520	5156100T50	CAP-EC6 10UFM 50V -RT-
C521	5121470552	CAP-CCCH 47PFJ 50V -RT-
C522	5121470552	CAP-CCCH 47PFJ 50V -RT-
C523	5075104501	CAP-MEF 0.1UFJ 100V CF
C524	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C525	5121101552	CAP-CCCH 100PFJ 50V -RT-
C526	5101102152	CAP-CCB 1000PFK 50V -RT-
C527	5101331132	CAP-CCB 330PFK 1KV -RT-
C529	5104103463	CAP-CCF 0.01UFZ 1.5KV -SF-
C530	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C531	5121330552	CAP-CCCH 33PFJ 50V -RT-
C532	5074104101	CAP-MEF 0.1UFK 100V -SF-
C533	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C534	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C535	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C536	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C537	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C538	515X109T50	CAP-ECX 1UFM 50V -RT-
C539	5103103212	CAP-CCE 0.01UFM 100V -RT-
C540	5103103212	CAP-CCE 0.01UFM 100V -RT-
C541	5103103212	CAP-CCE 0.01UFM 100V -RT-
C542	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C543	5074104102	CAP-MEF 0.1UFK 250V -SF-
C544	7140104214	CAP-X7R 0.1UFM 100V -RT-
C546	5121270552	CAP-CCCH 27PFJ 50V -RT-
C547	5121270552	CAP-CCCH 27PFJ 50V -RT-
C548	5121270552	CAP-CCCH 27PFJ 50V -RT-
C549	515X101T16	CAP-ECX 100UFM 16V -RT-
C550	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C551	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C552	5101222152	CAP-CCB 2200PFK 50V -RT-
C553	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C554	5134104452	CAP-SCF 0.1UFZ 50V -RT-
CRT501	457030423H	SOCKET CRT HPS0380-01-110
D501	4120141480	DIODE 1N4148 (SI) -AT-
D502	4120141480	DIODE 1N4148 (SI) -AT-
D503	4120141480	DIODE 1N4148 (SI) -AT-
D507	4120141480	DIODE 1N4148 (SI) -AT-
D508	4120141480	DIODE 1N4148 (SI) -AT-
D513	4120141480	DIODE 1N4148 (SI) -AT-
D514	4120141480	DIODE 1N4148 (SI) -AT-
D515	4120141480	DIODE 1N4148 (SI) -AT-
D516	413258020U	DIODE BAV20 DO-35 -AT-
D517	413258020U	DIODE BAV20 DO-35 -AT-
D518	413258020U	DIODE BAV20 DO-35 -AT-
D519	4120141480	DIODE 1N4148 (SI) -AT-
D520	4120146060	DIODE 1N4606 (SI) -AT-
D521	415943100A	IC TL431 REGULATOR TO-92 -RT-
D522	413258020U	DIODE BAV20 DO-35 -AT-
D523	413258020U	DIODE BAV20 DO-35 -AT-
D524	413258020U	DIODE BAV20 DO-35 -AT-
D525	413010426C	DIODE BYV26C KINK FORMING -AT-
D526	4120141480	DIODE 1N4148 (SI) -AT-
D527	4120141480	DIODE 1N4148 (SI) -AT-
D528	4120141480	DIODE 1N4148 (SI) -AT-
D529	4120141480	DIODE 1N4148 (SI) -AT-
D530	4120141480	DIODE 1N4148 (SI) -AT-
D531	4120141480	DIODE 1N4148 (SI) -AT-
FB502	4322309006	FERRITE BEAD 3UH -AT-
FB503	4322309006	FERRITE BEAD 3UH -AT-

REF	PART NO.	DESCRIPTION
FB505	4322309006	FERRITE BEAD 3UH -AT-
FB509	4322309004	FERRITE BEAD 3uH
FB510	4322309004	FERRITE BEAD 3uH
FB511	4322309004	FERRITE BEAD 3uH
FB512	4322309004	FERRITE BEAD 3uH
FB513	4322309004	FERRITE BEAD 3uH
IC501	4159241900	IC LM2419 11 PIN
IC502	4159942010	IC STV9420-4 16PIN
IC503	4159120700	IC LM1207N 28PIN
IC504	4159219000	IC LM319N
IC505	4159844N00	IC TDA8444N 16PIN
IC506	4150740600	IC 7406 16PIN
L501	4321338006	COIL PEAKING 0.33UH -AT-
L502	4321338006	COIL PEAKING 0.33UH -AT-
L503	4321338006	COIL PEAKING 0.33UH -AT-
P501	4491200130	CONN. 12P B12B-XH-A
Q501	411001376A	TRS. 2SA1376A TO-92 -RT-
Q502	4110219210	TRS. 2SC1921 TO-92M -RT-
Q503	411001376A	TRS. 2SA1376A TO-92 -RT-
Q504	4110219210	TRS. 2SC1921 TO-92M -RT-
Q505	411001376A	TRS. 2SA1376A TO-92 -RT-
Q506	4110219210	TRS. 2SC1921 TO-92M -RT-
Q507	411001376A	TRS. 2SA1376A TO-92 -RT-
Q508	411020945P	TRS. 2SC945P TO-92 -RT-
Q509	411020945P	TRS. 2SC945P TO-92 -RT-
Q510	4110007330	TRS. 2SA733 TO-92M -RT-
R501	4257041479	RES-PR MF 1/4W F 14.7R SMALL -
R502	4050510155	RES-CF 1/4W J 100R -AT- SMALL
R503	4257046049	RES-PR MF 1/4W F 60.4R SMALL -
R504	4050510155	RES-CF 1/4W J 100R -AT- SMALL
R505	4257047509	RES-PR MF 1/4W F 75R AT SMALL
R506	4257047509	RES-PR MF 1/4W F 75R AT SMALL
R507	4257042209	RES-PR MF 1/4W F 22R SMALL -AT
R508	4050510155	RES-CF 1/4W J 100R -AT- SMALL
R50A	4050547255	RES-CF 1/4W J 4.7K -AT- SMALL
R50B	4050510055	RES-CF 1/4W J 10R -AT- SMALL
R50C	4050518555	RES-CF 1/4W J 1.8M SMALL -AT-
R50D	4050510355	RES-CF 1/4W J 10K -AT- SMALL
R510	4050547255	RES-CF 1/4W J 4.7K -AT- SMALL
R511	4257041003	RES-PR MF 1/4W F 100K AT SMALL
R513	4050539255	RES-CF 1/4W J 3.9K -AT- SMALL
R514	4050530055	RES-CF 1/4W J 30R SMALL -AT-
R515	4050527255	RES-CF 1/4W J 2.7K -AT- SMALL
R516	4050539255	RES-CF 1/4W J 3.9K -AT- SMALL
R518	4050510555	RES-CF 1/4W J 1M -AT- SMALL
R519	4257047502	RES-PR MF 1/4W F 75K SMALL -AT
R520	4050582355	RES-CF 1/4W J 82K -AT- SMALL
R521	4050510055	RES-CF 1/4W J 10R -AT- SMALL
R522	4257048251	RES-PR MF 1/4W F 8.25K AT SMAL
R523	4257042151	RES-PR MF 1/4W F 2.15K AT SMAL
R524	4050510155	RES-CF 1/4W J 100R -AT- SMALL
R525	4050539155	RES-CF 1/4W J 390R -AT- SMALL
R526	4050510155	RES-CF 1/4W J 100R -AT- SMALL
R527	4050539155	RES-CF 1/4W J 390R -AT- SMALL
R528	4050510155	RES-CF 1/4W J 100R -AT- SMALL
R529	4050539155	RES-CF 1/4W J 390R -AT- SMALL
R530	4050510555	RES-CF 1/4W J 1M -AT- SMALL
R531	4050547355	RES-CF 1/4W J 47K -AT- SMALL
R532	4050522355	RES-CF 1/4W J 22K SMALL -AT-
R533	4050539255	RES-CF 1/4W J 3.9K -AT- SMALL

REF	PART NO.	DESCRIPTION
R534	4050510155	RES-CF 1/4W J 100R -AT- SMALL
R535	4050522355	RES-CF 1/4W J 22K SMALL -AT-
R536	4050547355	RES-CF 1/4W J 47K -AT- SMALL
R537	4050510555	RES-CF 1/4W J 1M -AT- SMALL
R538	4050539255	RES-CF 1/4W J 3.9K -AT- SMALL
R539	4050510155	RES-CF 1/4W J 100R -AT- SMALL
R540	4050510555	RES-CF 1/4W J 1M -AT- SMALL
R541	4050522355	RES-CF 1/4W J 22K SMALL -AT-
R542	4050547355	RES-CF 1/4W J 47K -AT- SMALL
R543	4050515255	RES-CF 1/4W J 1.5K SMALL -AT-
R544	4050547255	RES-CF 1/4W J 4.7K -AT- SMALL
R545	4050543255	RES-CF 1/4W J 4.3K SMALL -AT-
R546	4050515255	RES-CF 1/4W J 1.5K SMALL -AT-
R547	4050522455	RES-CF 1/4W J 220K SMALL -AT-
R548	4050522355	RES-CF 1/4W J 22K SMALL -AT-
R549	4050212355	RES-CF 1/2W J 12K -AT-
R550	4050510255	RES-CF 1/4W J 1K -AT- SMALL
R551	4050547255	RES-CF 1/4W J 4.7K -AT- SMALL
R552	4050547255	RES-CF 1/4W J 4.7K -AT- SMALL
R553	4050515255	RES-CF 1/4W J 1.5K SMALL -AT-
R554	4050510355	RES-CF 1/4W J 10K -AT- SMALL
R555	4050510355	RES-CF 1/4W J 10K -AT- SMALL
R556	4050510355	RES-CF 1/4W J 10K -AT- SMALL
R557	4050510355	RES-CF 1/4W J 10K -AT- SMALL
R558	4050510355	RES-CF 1/4W J 10K -AT- SMALL
R559	4050539255	RES-CF 1/4W J 3.9K -AT- SMALL
R560	4050510155	RES-CF 1/4W J 100R -AT- SMALL
R561	4060210115	RES-CC 1/2W K 100R -AT-
R562	4060210115	RES-CC 1/2W K 100R -AT-
R563	4060210115	RES-CC 1/2W K 100R -AT-
R564	4050239155	RES-CF 1/2W J 390R -AT-
R565	4060210115	RES-CC 1/2W K 100R -AT-
R566	4257042201	RES-PR MF 1/4W F 2.2K AT SMALL
R568	4050582255	RES-CF 1/4W J 8.2K -AT- SMALL
R569	4050522155	RES-CF 1/4W J 220R SMALL -AT-
R570	4050515155	RES-CF 1/4W J 150R SMALL -AT-
R571	4050522255	RES-CF 1/4W J 2.2K -AT- SMALL
R572	4050522255	RES-CF 1/4W J 2.2K -AT- SMALL
R573	4050518455	RES-CF 1/4W J 180K SMALL -AT-
R574	4050522255	RES-CF 1/4W J 2.2K -AT- SMALL
R575	4060251315	RES-CC 1/2W K 51K -AT-
R576	4050547255	RES-CF 1/4W J 4.7K -AT- SMALL
R577	4050522255	RES-CF 1/4W J 2.2K -AT- SMALL
R578	4050522255	RES-CF 1/4W J 2.2K -AT- SMALL
R579	4050515355	RES-CF 1/4W J 15K -AT- SMALL
R580	4050522255	RES-CF 1/4W J 2.2K -AT- SMALL
R581	4050515255	RES-CF 1/4W J 1.5K SMALL -AT-
R582	4050515255	RES-CF 1/4W J 1.5K SMALL -AT-
R583	4050515255	RES-CF 1/4W J 1.5K SMALL -AT-
R584	4050156255	RES-CF 1/2W J 5.6K SMALL -AT-
R585	4050156255	RES-CF 1/2W J 5.6K SMALL -AT-
R586	4050156255	RES-CF 1/2W J 5.6K SMALL -AT-
R587	4050515355	RES-CF 1/4W J 15K -AT- SMALL
R588	4050516255	RES-CF 1/4W J 1.6K -AT- SMALL
R589	4050510155	RES-CF 1/4W J 100R -AT- SMALL
R590	4050510155	RES-CF 1/4W J 100R -AT- SMALL
R591	4050510455	RES-CF 1/4W J 100K -AT- SMALL
R597	4050510155	RES-CF 1/4W J 100R -AT- SMALL
R598	4050510155	RES-CF 1/4W J 100R -AT- SMALL
R599	4050510155	RES-CF 1/4W J 100R -AT- SMALL

REF.	PART NO.	DESCRIPTION
Q356	4110306670	TRS. 2SD667C TO-92M -RT-
Q357	4110106470	TRS. 2SB647C TO-92M -RT-
Q358	4111503660	TRS. 2SK366-BL TO-92
Q359	4110209450	TRS. 2SC945P TO-92 -RT-
Q360	4114522220	TRS. FET VN2222LL -RT-
Q4	4110105610	TRS. 2SB561 TO-92 -RT-
Q410	4100226880	TRS. 2SC2688 TO-126
Q420	4110209450	TRS. 2SC945P TO-92 -RT-
Q5	4100226880	TRS. 2SC2688 TO-126
Q6	4101515070	TRS. MOSFET 2SK1507 TO-220
Q8	4110221200	TRS. 2SC2120Y TO-92 -RT-
QP1	4110221200	TRS. 2SC2120Y TO-92 -RT-
QP2	4110221200	TRS. 2SC2120Y TO-92 -RT-
QP3	4105906400	TRS. IRF840 TO-220
QP4	4116610010	TRS. RN1001 -RT-
QP5	4116610010	TRS. RN1001 -RT-
QP6	4110105610	TRS. 2SB561 TO-92 -RT-
R1	4050256455	RES-CF 1/2W J 560K -AT-
R12	4171051256	RES-MOF 1W J 5.1K -AT-
R13	4171013456	RES-MOF 1W J 130K -AT-
R14	4171013456	RES-MOF 1W J 130K -AT-
R16	4050520155	RES-CF 1/4W J 200R -AT- SMALL
R17	4050510355	RES-CF 1/4W J 10K -AT- SMALL
R19	4257048451	RES-PR MF 1/4W F 8.45K SMALL -
R20	4050510155	RES-CF 1/4W J 100R -AT- SMALL
R201	4257049311	RES-PR MF 1/4W F 9.31K SMALL -
R202	4050230155	RES-CF 1/2W J 300R -AT-
R203	4171013956	RES-MOF 1W J 1.3R -AT-
R204	4257044641	RES-PR MF 1/4W F 4.64K SMALL -
R205	4050562355	RES-CF 1/4W J 62K SMALL -AT-
R206	4050524955	RES-CF 1/4W J 2.4R SMALL -AT-
R207	4050575255	RES-CF 1/4W J 7.5K -AT- SMALL
R208	4257046801	RES-PR MF 1/4W F 6.8K AT SMALL
R209	4050539355	RES-CF 1/4W J 39K SMALL -AT-
R210	4050575955	RES-CF 1/4W J 7.5R SMALL -AT-
R211	4257049311	RES-PR MF 1/4W F 9.31K SMALL -
R212	4257048201	RES-PR MF 1/4W F 8.2K AT SMALL
R22	4050515355	RES-CF 1/4W J 15K -AT- SMALL
R23	4050515355	RES-CF 1/4W J 15K -AT- SMALL
R230	4172032353	RES-MOF 2W J 320K -SF- SMALL
R232	4050527455	RES-CF 1/4W J 270K SMALL -AT-
R24	4050547155	RES-CF 1/4W J 470R SMALL -AT-
R243	4050210955	RES-CF 1/2W J 1R -AT-
R244	4050210955	RES-CF 1/2W J 1R -AT-
R245	4050515355	RES-CF 1/4W J 15K -AT- SMALL
R25	4050510255	RES-CF 1/4W J 1K -AT- SMALL
R26	4050551255	RES-CF 1/4W J 5.1K -AT- SMALL
R27	4050520355	RES-CF 1/4W J 20K -AT- SMALL
R28	4050551255	RES-CF 1/4W J 5.1K -AT- SMALL
R29	4050547055	RES-CF 1/4W J 47R -AT- SMALL
R3	7105010037	THMER. +-15% 10R 5A 15+ W/KINK
R30	4050575155	RES-CF 1/4W J 750R SMALL -AT-
R301	4172024156	RES-MOF 2W J 240R -AT-
R302	4171018156	RES-MOF 1W J 180R -AT-
R303	4050522355	RES-CF 1/4W J 22K SMALL -AT-
R304	4172020956	RES-MOF 2W J 2R -AT-
R305	4050510255	RES-CF 1/4W J 1K -AT- SMALL
R306	4172022956	RES-MOF 2W J 2.2R -AT-
R307	4172056056	RES-MOF 2W J 56R -AT-
R308	4172036053	RES-MOF 2W J 36R -SF-

REF.	PART NO.	DESCRIPTION
R309	4050510555	RES-CF 1/4W J 1M -AT- SMALL
R31	4050533055	RES-CF 1/4W J 33R -AT- SMALL
R310	4050568255	RES-CF 1/4W J 6.8K SMALL -AT-
R311	4050510355	RES-CF 1/4W J 10K -AT- SMALL
R312	4050518455	RES-CF 1/4W J 180K SMALL -AT-
R313	4050510355	RES-CF 1/4W J 10K -AT- SMALL
R314	4050562355	RES-CF 1/4W J 62K SMALL -AT-
R315	4050575355	RES-CF 1/4W J 75K SMALL -AT-
R316	4050510355	RES-CF 1/4W J 10K -AT- SMALL
R317	4050510355	RES-CF 1/4W J 10K -AT- SMALL
R318	4050522255	RES-CF 1/4W J 2.2K -AT- SMALL
R319	4050524355	RES-CF 1/4W J 24K -AT- SMALL
R32	4050547255	RES-CF 1/4W J 4.7K -AT- SMALL
R320	4172032353	RES-MOF 3W J 20K -SF- SMALL
R321	4050247055	RES-CF 1/2W J 47R -AT-
R322	4172018056	RES-MOF 2W J 18R -AT-
R324	4050510555	RES-CF 1/4W J 1M -AT- SMALL
R325	4050510255	RES-CF 1/4W J 1K -AT- SMALL
R326	4050510355	RES-CF 1/4W J 10K -AT- SMALL
R329	4172075856	RES-MOF 2W J 0.75R -AT-
R33	4050551255	RES-CF 1/4W J 5.1K -AT- SMALL
R330	4050520455	RES-CF 1/4W J 200K -AT- SMALL
R331	4050527455	RES-CF 1/4W J 270K SMALL -AT-
R332	4050527455	RES-CF 1/4W J 270K SMALL -AT-
R333	4050510355	RES-CF 1/4W J 10K -AT- SMALL
R335	4050527455	RES-CF 1/4W J 270K SMALL -AT-
R336	4050547255	RES-CF 1/4W J 4.7K -AT- SMALL
R337	4257041332	RES-PR MF 1/4W F 13.3K AT SMAL
R339	4050520255	RES-CF 1/4W J 2K -AT- SMALL
R34	4050527155	RES-CF 1/4W J 270R -AT- SMALL
R340	4050530355	RES-CF 1/4W J 30K SMALL -AT-
R341	4050551255	RES-CF 1/4W J 5.1K -AT- SMALL
R342	4050551255	RES-CF 1/4W J 5.1K -AT- SMALL
R343	4050247355	RES-CF 1/2W J 47K -AT-
R344	4172022956	RES-MOF 2W J 2.2R -AT-
R345	4050510255	RES-CF 1/4W J 1K -AT- SMALL
R346	4050522355	RES-CF 1/4W J 22K SMALL -AT-
R348	4050522455	RES-CF 1/4W J 220K SMALL -AT-
R349	4050510155	RES-CF 1/4W J 100R -AT- SMALL
R35	4050518055	RES-CF 1/4W J 18R -AT- SMALL
R350	4050522255	RES-CF 1/4W J 2.2K -AT- SMALL
R351	4050247355	RES-CF 1/2W J 47K -AT-
R354	4050510355	RES-CF 1/4W J 10K -AT- SMALL
R355	4050522255	RES-CF 1/4W J 2.2K -AT- SMALL
R356	4050510255	RES-CF 1/4W J 1K -AT- SMALL
R357	4257042431	RES-PR MF 1/4W F 2.43K AT SMAL
R358	4050547255	RES-CF 1/4W J 4.7K -AT- SMALL
R359	4050547255	RES-CF 1/4W J 4.7K -AT- SMALL
R36	4050527255	RES-CF 1/4W J 2.7K -AT- SMALL
R360	4050518455	RES-CF 1/4W J 180K SMALL -AT-
R362	4050539355	RES-CF 1/4W J 39K SMALL -AT-
R363	4050527255	RES-CF 1/4W J 2.7K -AT- SMALL
R364	4050568155	RES-CF 1/4W J 680R SMALL -AT-
R365	4172033356	RES-MOF 2W J 33K -AT-
R366	4050510255	RES-CF 1/4W J 1K -AT- SMALL
R367	4257043320	RES-PR MF 1/4W F 332R SMALL -A
R369	4050522355	RES-CF 1/4W J 22K SMALL -AT-
R37	4050547155	RES-CF 1/4W J 470R SMALL -AT-
R370	4050522255	RES-CF 1/4W J 2.2K -AT- SMALL
R371	4050513455	RES-CF 1/4W J 130K SMALL -AT-

REF.	PART NO.	DESCRIPTION
R372	4050512455	RES-CF 1/4W J 120K -AT- SMALL
R373	4050510155	RES-CF 1/4W J 100R -AT- SMALL
R374	4172018156	RES-MOF 2W J 120R -AT-
R375	4257042101	RES-PR MF 1/4W F 2.1K SMALL -A
R376	4172036053	RES-MOF 2W J 36R -SF-
R377	4050520455	RES-CF 1/4W J 200K -AT- SMALL
R378	4050510255	RES-CF 1/4W J 1K -AT- SMALL
R379	4257044221	RES-PR MF 1/4W F 4.22K SMALL -
R38	4177224356	RES-MOF 2W J 24K SMALL -AT-
R380	4050510255	RES-CF 1/4W J 1K -AT- SMALL
R381	4050520455	RES-CF 1/4W J 200K -AT- SMALL
R382	4050518255	RES-CF 1/4W J 1.8K -AT- SMALL
R383	4257044221	RES-PR MF 1/4W F 4.22K SMALL -
R384	4050562355	RES-CF 1/4W J 62K SMALL -AT-
R385	4257041002	RES-PR MF 1/4W F 10K AT SMALL
R386	4050510155	RES-CF 1/4W J 100R -AT- SMALL
R387	4050515955	RES-CF 1/4W J 1.5R SMALL -AT-
R388	4257046982	RES-PR MF 1/4W F 69.8K SMALL -
R389	4050556355	RES-CF 1/4W J 56K SMALL -AT-
R39	4050510555	RES-CF 1/4W J 1M -AT- SMALL
R390	4050524455	RES-CF 1/4W J 240K SMALL -AT-
R391	4050547455	RES-CF 1/4W J 470K SMALL -AT-
R392	4050511355	RES-CF 1/4W J 11K SMALL -AT-
R393	4050582455	RES-CF 1/4W J 820K SMALL -AT-
R394	4050510355	RES-CF 1/4W J 10K -AT- SMALL
R395	4050510355	RES-CF 1/4W J 10K -AT- SMALL
R396	4050511355	RES-CF 1/4W J 11K SMALL -AT-
R397	4050510255	RES-CF 1/4W J 1K -AT- SMALL
R398	4050510255	RES-CF 1/4W J 1K -AT- SMALL
R399	4050510255	RES-CF 1/4W J 1K -AT- SMALL
R40	4095020256	RES-WW 5W J 2K SQM-A
R401	4050533255	RES-CF 1/4W J 3.3K -AT- SMALL
R402	4050547355	RES-CF 1/4W J 47K -AT- SMALL
R403	4257044751	RES-PR MF 1/4W F 4.75K AT SMAL
R404	4050547355	RES-CF 1/4W J 47K -AT- SMALL
R405	4050547355	RES-CF 1/4W J 47K -AT- SMALL
R406	4050575355	RES-CF 1/4W J 75K SMALL -AT-
R407	4050518455	RES-CF 1/4W J 180K SMALL -AT-
R408	4050547355	RES-CF 1/4W J 47K -AT- SMALL
R41	4050510555	RES-CF 1/4W J 1M -AT- SMALL
R410	4050522255	RES-CF 1/4W J 2.2K -AT- SMALL
R411	4050522355	RES-CF 1/4W J 22K SMALL -AT-
R412	4050543355	RES-CF 1/4W J 43K SMALL -AT-
R413	4050539355	RES-CF 1/4W J 39K SMALL -AT-
R42	4050513255	RES-CF 1/4W J 1.3K -AT- SMALL
R420	4172018056	RES-MOF 2W J 10R -AT-
R421	4050515455	RES-CF 1/4W J 150K SMALL -AT-
R422	4050220455	RES-CF 1/2W J 200K -AT-
R423	4050520455	RES-CF 1/4W J 200K -AT- SMALL
R424	4050520355	RES-CF 1/4W J 20K -AT- SMALL
R425	4050575255	RES-CF 1/4W J 7.5K -AT- SMALL
R426	4050568455	RES-CF 1/4W J 680K SMALL -AT-
R427	4050515355	RES-CF 1/4W J 15K -AT- SMALL
R428	4050551255	RES-CF 1/4W J 5.1K -AT- SMALL
R429	4050562455	RES-CF 1/4W J 620K SMALL -AT-
R43	4050543055	RES-CF 1/4W J 43R -AT- SMALL
R430	4050522355	RES-CF 1/4W J 22K SMALL -AT-
R431	4050520155	RES-CF 1/4W J 200R -AT- SMALL
R44	4050533055	RES-CF 1/4W J 33R -AT- SMALL
R441	4050520255	RES-CF 1/4W J 2K -AT- SMALL

REF.	PART NO.	DESCRIPTION
R442	4050510355	RES-CF 1/4W J 10K -AT- SMALL
R443	4050510355	RES-CF 1/4W J 10K -AT- SMALL
R449	4172033156	RES-MOF 2W J 330R -AT-
R45	4072033855	RES-MF 2W J 0.33R -AT-
R450	4050591255	RES-CF 1/4W J 9.1K SMALL -AT-
R451	4050510455	RES-CF 1/4W J 100K -AT- SMALL
R452	4050515455	RES-CF 1/4W J 150K SMALL -AT-
R453	4050510455	RES-CF 1/4W J 100K -AT- SMALL
R454	4050510555	RES-CF 1/4W J 1M -AT- SMALL
R455	4050575355	RES-CF 1/4W J 75K SMALL -AT-
R457	4172020956	RES-MOF 2W J 2R -AT-
R458	4050510155	RES-CF 1/4W J 100R -AT- SMALL
R459	4257041003	RES-PR MF 1/4W F 100K AT SMALL
R46	4050222155	RES-CF 1/2W J 220R -AT-
R460	4050527055	RES-CF 1/4W J 27R SMALL -AT-
R461	4050527055	RES-CF 1/4W J 27R SMALL -AT-
R47	4171075356	RES-MOF 1W J 75K -AT-
R48	4172022056	RES-MOF 2W J 22R -AT-
R49	4257046201	RES-PR MF 1/4W F 6.2K AT SMALL
R5	4071033855	RES-MF 1W J 0.33R -AT-
R50	4257049400	RES-PR MF 1/4W F 940R AT SMALL
R51	4050222355	RES-CF 1/2W J 22K -AT-
R52	4050510255	RES-CF 1/4W J 1K -AT- SMALL
R53	4050510255	RES-CF 1/4W J 1K -AT- SMALL
R54	4050591255	RES-CF 1/4W J 9.1K SMALL -AT-
R56	4050510355	RES-CF 1/4W J 10K -AT- SMALL
R57	4050510555	RES-CF 1/4W J 1M -AT- SMALL
R59	4050547255	RES-CF 1/4W J 4.7K -AT- SMALL
R6	4095010351	RES-WW 5W J 10K SQM-SF
R60	4171015956	RES-MOF 1W J 1.5R -AT-
R61	4050222155	RES-CF 1/2W J 220R -AT-
R62	4050520255	RES-CF 1/4W J 2K -AT- SMALL
R64	4050547155	RES-CF 1/4W J 470R SMALL -AT-
R65	4050547255	RES-CF 1/4W J 4.7K -AT- SMALL
R66	4050533055	RES-CF 1/4W J 33R -AT- SMALL
R67	4050510155	RES-CF 1/4W J 100R -AT- SMALL
R68	4050510155	RES-CF 1/4W J 100R -AT- SMALL
R69	4050510155	RES-CF 1/4W J 100R -AT- SMALL
R7	4171051256	RES-MOF 1W J 5.1K -AT-
R70	4050510355	RES-CF 1/4W J 10K -AT- SMALL
R71	4050510055	RES-CF 1/4W J 10R -AT- SMALL
R8	4050527255	RES-CF 1/4W J 2.7K -AT- SMALL
RL301	4420412002	RELAY 12V
RP10	4050568255	RES-CF 1/4W J 6.8K SMALL -AT-
RP11	4050510255	RES-CF 1/4W J 1K -AT- SMALL
RP12	4050510355	RES-CF 1/4W J 10K -AT- SMALL
RP13	4050510655	RES-CF 1/4W J 10M SMALL -AT-
RP14	4257041003	RES-PR MF 1/4W F 100K AT SMALL
RP15	4050522055	RES-CF 1/4W J 22R SMALL -AT-
RP16	4050518255	RES-CF 1/4W J 1.8K -AT- SMALL
RP17	4050510355	RES-CF 1/4W J 10K -AT- SMALL
RP18	4050510355	RES-CF 1/4W J 10K -AT- SMALL
RP21	4050510255	RES-CF 1/4W J 1K -AT- SMALL
RP22	4050510255	RES-CF 1/4W J 1K -AT- SMALL
RP23	4172020256	RES-MOF 2W J 2K -AT-
RP24	4050522355	RES-CF 1/4W J 22K SMALL -AT-
RP4	4050510155	RES-CF 1/4W J 100R -AT- SMALL
RP5	4050510255	RES-CF 1/4W J 1K -AT- SMALL
RP6	4050510255	RES-CF 1/4W J 1K -AT- SMALL
RP7	4257041802	RES-PR MF 1/4W F 18K AT SMALL

REF.	PART NO.	DESCRIPTION
C29	5128471552	CAP-CCSL 470PFJ 50V -RT-
C3	5065224425	CAP-MPR 0.22UFM 250V -SF-
C30	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C302	515X221T25	CAP-ECX 220UFM 25V -RT-
C303	5113224150	CAP-MC 0.22UFK 50V -SF-
C304	5116472111	CAP-MC 0.0047UFK 100V -RT-
C306	5195822573	CAP-PMHA 8200PFJ 1.6KV -SF-
C307	5092682565	CAP-PP 6800PFJ 630V P:10MM -SF
C308	5074475101	CAP-MEF 4.7UFK 100V -SF-
C31	5116104150	CAP-MC 0.1UFK 50V -RT-
C310	515X221T25	CAP-ECX 220UFM 25V -RT-
C311	5195514543	CAP-PMHA 0.51UFJ 400V -SF-
C312	5116104111	CAP-MC 0.1UFK 100V -RT-
C313	5190184543	CAP-MPP 0.18UFJ 400V P:22.5MM
C315	5156470T50	CAP-EC6 47UFM 50V -RT-
C316	515X471S25	CAP-ECX 470UFM 25V -SF-
C317	515X471S25	CAP-ECX 470UFM 25V -SF-
C318	5128391552	CAP-CCSL 390PFJ 50V -RT-
C319	5156229T50	CAP-EC6 2.2UFM 50V -RT-
C32	5101101132	CAP-CCB 100PFK 1KV -RT-
C320	5156100S03	CAP-EC6 10UFM 250V -SF-
C321	5116103111	CAP-MC 0.01UFK 100V -RT-
C322	5101821152	CAP-CCB 820PFK 50V -RT-
C323	5074333102	CAP-MEF 0.033UFK 250V P:10mm -
C324	5190105543	CAP-MPP 1UFJ 400V -SF-
C325	5113224150	CAP-MC 0.22UFK 50V -SF-
C326	5074104104	CAP-MEF 0.1UFK 400V -SF-
C329	5190333553	CAP-MPP 0.033UFJ 1500V -SF-
C33	515X102S25	CAP-ECX 1000UFM 25V -SF-
C330	5116103111	CAP-MC 0.01UFK 100V -RT-
C331	5101681132	CAP-CCB 680PFK 1KV -RT-
C333	5116104111	CAP-MC 0.1UFK 100V -RT-
C334	5116104111	CAP-MC 0.1UFK 100V -RT-
C339	5074684101	CAP-MEF 0.68UFK 100V -SF-
C34	5156101T10	CAP-EC6 100UFM 10V -RT-
C342	5101102132	CAP-CCB 1000PFK 1KV -RT-
C343	515X109T50	CAP-ECX 1UFM 50V -RT-
C344	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C345	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C347	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C349	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C350	5156109T50	CAP-EC6 1UFM 50V -RT-
C354	5156109T50	CAP-EC6 1UFM 50V -RT-
C355	5156478T50	CAP-EC6 0.47UFM 50V -RT-
C357	5116682111	CAP-MC 6800PFK 100V -RT-
C358	5116473111	CAP-MC 0.047UFK 100V -RT-
C359	5128221552	CAP-CCSL 220PFJ 50V -RT-
C36	515F471S25	CAP-ECF 470UFM 25V -SF-
C360	5101471132	CAP-CCB 470PFK 1KV -RT-
C361	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C362	5092222615	CAP-PP 0.0022UFG 100V P:7.5mm
C364	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C365	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C366	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C369	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C370	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C371	5074104101	CAP-MEF 0.1UFK 100V -SF-
C372	5116104150	CAP-MC 0.1UFK 50V -RT-
C373	5075474505	CAP-MEF 0.47UFJ 50V -RT-
C374	5156229T50	CAP-EC6 2.2UFM 50V -RT-
C375	5156100T50	CAP-EC6 10UFM 50V -RT-
C376	5116102111	CAP-MC 0.001UFK 100V -RT-
C377	5116153111	CAP-MC 0.015UFK 100V -RT-
C378	5156229T50	CAP-EC6 2.2UFM 50V -RT-
C379	5116223111	CAP-MC 0.022UFK 100V -RT-
C38	5101102132	CAP-CCB 1000PFK 1KV -RT-
C380	5156471S16	CAP-EC6 470UFM 16V -SF-
C381	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C382	5144102550	CAP-CQS 0.001UFJ 50V -SF-
C383	5156101T25	CAP-EC6 100UFM 25V -RT-
C384	5075224550	CAP-CF 0.22UFJ 50V P:5MM -RT-
C385	5156109T50	CAP-EC6 1UFM 50V -RT-
C386	5116104150	CAP-MC 0.1UFK 50V -RT-
C388	5128221552	CAP-CCSL 220PFJ 50V -RT-
C389	5116152550	CAP-MC 0.0015UFJ 50V -RT-
C39	5101102132	CAP-CCB 1000PFK 1KV -RT-
C390	5156101T25	CAP-EC6 100UFM 25V -RT-
C391	5116104111	CAP-MC 0.1UFK 100V -RT-
C392	5156109T50	CAP-EC6 1UFM 50V -RT-
C393	5128271552	CAP-CCSL 270PFJ 50V -RT-
C394	5128101152	CAP-CCSL 100PFK 50V -RT-
C395	5128101152	CAP-CCSL 100PFK 50V -RT-
C396	5116104111	CAP-MC 0.1UFK 100V -RT-
C397	5116104111	CAP-MC 0.1UFK 100V -RT-
C398	5116103111	CAP-MC 0.01UFK 100V -RT-
C4	5065224425	CAP-MPR 0.22UFM 250V -SF-
C410	5074153104	CAP-MEF 0.015UFK 400V -SF-
C411	5113224111	CAP-MC 0.22UFK 100V -SF-
C412	5074103104	CAP-MEF 0.01UFK 400V -SF-
C413	5162229250	CAP-NP 2.2UFM 50V 85C
C414	5116104111	CAP-MC 0.1UFK 100V -RT-
C415	5116104111	CAP-MC 0.1UFK 100V -RT-
C42	5156470T01	CAP-EC6 47UFM 100V -RT-
C424	5116393150	CAP-MC 0.039UFJ 50V -RT-
C47	5101103112	CAP-CCB 0.01UFK 100V -RT-
C49	5101102132	CAP-CCB 1000PFK 1KV -RT-
C5	5061472440	CAP-CCS 4700PFM 400V -SF-
C52	5128221552	CAP-CCSL 220PFJ 50V -RT-
C54	5162100T25	CAP-NP 10UFM 25V RT 85C
C55	5075474505	CAP-MEF 0.47UFJ 50V -RT-
C6	5061472440	CAP-CCS 4700PFM 400V -SF-
C7	5061472440	CAP-CCS 4700PFM 400V -SF-
C8	5061472440	CAP-CCS 4700PFM 400V -SF-
C9	515P331S04	CAP-ECP 330UFM 400V -SF-
CP10	515X221S07	CAP-ECX 220UFM 200V -SF-
CP11	5074104102	CAP-MEF 0.1UFK 250V -SF-
CP12	5156100T50	CAP-EC6 10UFM 50V -RT-
CP13	5116104150	CAP-MC 0.1UFK 50V -RT-
CP14	5074103102	CAP-MEF 0.01UFK 250V -SF-
CP15	5101102132	CAP-CCB 1000PFK 1KV -RT-
CP16	5156220T25	CAP-EC6 22UFM 25V -RT-
CP17	5134104452	CAP-SCF 0.1UFZ 50V -RT-
CP3	5128681552	CAP-CCSL 680PFJ 50V -RT-
CP4	5116102111	CAP-MC 0.001UFK 100V -RT-
CP5	5116102111	CAP-MC 0.001UFK 100V -RT-
CP6	5156100T50	CAP-EC6 10UFM 50V -RT-
CP7	5128331552	CAP-CCSL 330PFJ 50V -RT-
CP8	5116103111	CAP-MC 0.01UFK 100V -RT-
D09	4120146060	DIODE 1N4606 (SI) -AT-
D10	4120146060	DIODE 1N4606 (SI) -AT-

REF.	PART NO.	DESCRIPTION
D11	4120146060	DIODE 1N4606 (SI) -AT-
D12	4120146060	DIODE 1N4606 (SI) -AT-
D13	4120146060	DIODE 1N4606 (SI) -AT-
D14	4120146060	DIODE 1N4606 (SI) -AT-
D15	413010426C	DIODE BYV26C KINK FORMING -AT-
D16	41303031F6	DIODE 31DF6
D17	41303031F6	DIODE 31DF6
D18	41303030F2	DIODE 30DF2
D19	41303030F2	DIODE 30DF2
D20	4120104001	DIODE 1N4001 -AT-
D21	4120104001	DIODE 1N4001 -AT-
D210	4120104001	DIODE 1N4001 -AT-
D211	4120104001	DIODE 1N4001 -AT-
D212	4120104002	DIODE 1N4002 -AT-
D213	4120141480	DIODE 1N4148 (SI) -AT-
D214	4130100218	DIODE RGP02-18E-5300 -AT-
D215	4130100218	DIODE RGP02-18E-5300 -AT-
D216	4120141480	DIODE 1N4148 (SI) -AT-
D217	413010426C	DIODE BYV26C KINK FORMING -AT-
D22	41303030F2	DIODE 30DF2
D23	4120104001	DIODE 1N4001 -AT-
D24	41303031F6	DIODE 31DF6
D301	4131014590	DIODE BY459F-1500 SOD-100
D302	4120141480	DIODE 1N4148 (SI) -AT-
D303	4130400260	DIODE FMGG26S TO-220
D308	413010010D	DIODE RGP10D-5302 -AT- 1A
D309	413010010D	DIODE RGP10D-5302 -AT- 1A
D310	4120141480	DIODE 1N4148 (SI) -AT-
D311	413010010J	DIODE RGP10J-5390 1A 600V -AT-
D312	413020120A	DIODE EGP-20A -AT-
D314	413010010D	DIODE RGP10D-5302 -AT- 1A
D315	4120141480	DIODE 1N4148 (SI) -AT-
D332	4130500200	DIODE GTP-G2 FR TO-220
D333	4120141480	DIODE 1N4148 (SI) -AT-
D334	413010010J	DIODE RGP10J-5390 1A 600V -AT-
D350	413010010J	DIODE RGP10J-5390 1A 600V -AT-
D371	4120141480	DIODE 1N4148 (SI) -AT-
D372	4120141480	DIODE 1N4148 (SI) -AT-
D373	413010010D	DIODE RGP10D-5302 -AT- 1A
D374	4120141480	DIODE 1N4148 (SI) -AT-
D375	4120141480	DIODE 1N4148 (SI) -AT-
D401	4120141480	DIODE 1N4148 (SI) -AT-
D5	413010426C	DIODE BYV26C KINK FORMING -AT-
D6	4120104001	DIODE 1N4001 -AT-
D7	413010426C	DIODE BYV26C KINK FORMING -AT-
D8	413010426D	DIODE 1A/800V BYV26D
DP1	4120146060	DIODE 1N4606 (SI) -AT-
DP2	413015095C	DIODE BYV95C SOD-57
DP3	41303031F4	DIODE 3A/400V 3SNS 31DF4 -AT-
DP4	4120146060	DIODE 1N4606 (SI) -AT-
F1	5268400052	FUSE 4A/250VAC
FB1	4322209046	FERRITE BEAD 2UH -AT-
FB2	4322209046	FERRITE BEAD 2UH -AT-
FB3	4322209046	FERRITE BEAD 2UH -AT-
FB4	4322209046	FERRITE BEAD 2UH -AT-
FB6	4322209046	FERRITE BEAD 2UH -AT-
FB7	4322209046	FERRITE BEAD 2UH -AT-
FBP1	4322309006	FERRITE BEAD 3UH -AT-
IC2	4159384200	IC UC3842A 8PIN
IC202	4159817200	IC TDA8172 7PIN

REF.	PART NO.	DESCRIPTION
IC3	4159393000	IC LM 393 14PIN
IC302	4159358000	IC LMT358N 8PIN
IC303	4159358000	IC LMT358N 8PIN
IC304	41599102C0	IC TDA9102C 20PIN
IC305	4159495000	IC TDA4950 8PIN
IC306	41598444N0	IC TDA8444N 16PIN
IC307	41598444N0	IC TDA8444N 16PIN
IC4	415943100A	IC TL431 REGULATOR TO-92 -RT-
IC5	4159781201	IC MC7812 3PIN
IC6	4159780501	IC 7805 REGULATOR 3PIN
ICP2	4159555000	IC NE555 8PIN
ICP3	415943100A	IC TL431 REGULATOR TO-92 -RT-
K1	4420812006	RELAY OMI-SS-212L
L1	4321120006	COIL PEAKING 12UH -AT-
L301	4325339003	COIL CHOKE 3.3MH -SF-
L302	4323529003	COIL CHOKE 5.2UH -SF-
L303	708S2014T1	COIL LINEARITY -SF-
L304	4325141003	COIL CHOKE 146UH -SF-
L305	4323900103	COIL CHOKE 90UH -SF-
L306	4321399006	COIL PEAKING 3.9UH -AT-
L307	4321399006	COIL PEAKING 3.9UH -AT-
L308	4322309006	FERRITE BEAD 3UH -AT-
L309	4322209046	FERRITE BEAD 2UH -AT-
L310	4322209046	FERRITE BEAD 2UH -AT-
L311	4321100006	COIL PEAKING 10UH -AT-
L401	4321100006	COIL PEAKING 10UH -AT-
LP1	4320205003	COIL CHOKE 2MH -SF-
LP2	4322209046	FERRITE BEAD 2UH -AT-
LP3	4322209046	FERRITE BEAD 2UH -AT-
LP4	4322209046	FERRITE BEAD 2UH -AT-
P1	4490400207	CONN. 4P WAFER ROUND PIN
P2	4493000160	CONN. 30P SIMM SOCKETS AL03000
P5	4490200130	CONN. 2P WAFER 2.5MM
P7	4490401104	CONN. 4P MH11041-H1
PH1	4159435002	POTO COUPLER X'STER 4N35 W=10
PTCR1	7021141400	PTCR DGC 2R14M
Q1	411020945P	TRS. 2SC945P TO-92 -RT-
Q10	411030667C	TRS. 2SD667C TO-92M -RT-
Q11	411030667C	TRS. 2SD667C TO-92M -RT-
Q2	4114510080	TRS. SCR MCR100-8 TO-92 -RT-
Q3	4114501006	TRS. MCR100-6 TO-92 -RT-
Q301	4100250480	TRS. 2SC5048 TO-3P
Q302	4105906400	TRS. IRF640 TO-220
Q304	4103200122	TRS. TIP 122
Q305	410010649A	TRS. 2SB649A TO-126
Q307	411020945P	TRS. 2SC945P TO-92 -RT-
Q308	4100106610	TRS. 2SB861
Q309	4116812030	TRS. RN1203 -RT-
Q310	4105906200	TRS. MOSFET IRF620 TO-220
Q311	4101511010	TRS. MOSFET 2SK1101 SC-67
Q312	4110007330	TRS. 2SA733 TO-92M -RT-
Q345	4111139040	TRS. 2N3904 TO-92 -RT-
Q346	4116810010	TRS. RN1001 -RT-
Q347	411020945P	TRS. 2SC945P TO-92 -RT-
Q348	4116812030	TRS. RN1203 -RT-
Q350	4116810010	TRS. RN1001 -RT-
Q352	4100226880	TRS. 2SC2688 TO-126
Q353	410030669A	TRS. 2SD669A TO-126
Q354	411010647C	TRS. 2SB647C TO-92M -RT-
Q355	410031264A	TRS. 2SD1264A

Section 9.
PCB Component List

9.1. Explanation of Parts Listing

This section contains a complete listing of the components used on the printed circuit boards contained in the system. For a listing of the mechanical parts, please refer to Section 8., Mechanical Parts.

The list of parts in this section is separated by PCB, and the order of the listing is based on the location reference (REF.) printed on the circuit board and shown in the schematics. Components without a reference location are listed at the beginning of each table in order of the part number, and the location reference of the part with which they are connected is given in the description.

For example:

	2003097301	HEAT SINK FOR Q1

shows Part No. 2003097301, which is connected or related to the components with a location reference of Q1.

Shaded items indicate comonents that are critical for safety or are of proprietary design and must be replaced with parts of the exact same specification or ordered directly from the manufacturer.

For example:

Q1	4101515070	TRS. MOSFET 2SK1507 TO-220

Indicates that the TRS. MOSFET, Part No. 4101515070 located at reference Q1, should onlybe replaced with the exact same part ordered from the manufacturer.

9.2. Main Board

REF.	PART NO.	DESCRIPTION
	R07F18044V1	MAIN PCB ASS'Y
	2001097F10	#U BRACKET
	2003097301	HEAT SINK FOR Q6
	2004191630	HEAT SINK HOLDER FOR Q6
	2005097F10	#COVER FBT FOR T302
	2009096320	HEAT SINK FOR IC202
	2046294000	HEAT SINK F FOR Q308
	3052000300	EYELET FOR FBT X3
	3652TCBS10	SPACER SUPPORT (TCBS-10) FOR FBT COVER
	4141108503	#P.C.B. MAIN
	4692300001	CLIP-FUSE 5MM FOR F1
	5290007000	TUBE-SHRINK ID=7+ FOR C20
	5322235704	WIRE 1007 #22 ORG 560MM-TERM
	5322237601	WIRE 1007 AWG22 ORG 750-5-5 FOR FBT
	5541025095	CABLE TIE 2.5X90 FOR G2,G4,FOCUS WIRE
	5560020040	FERRITE CORE (RH 17.5X13.5X9 FOR G2,G4,FOCUS WIRE
	5560080003	CORE-FE 2643665802 FOR G2
	7050301700	F.B.T.
	8127113006	SCREW PAN(+)/HD CAP TAPPING M3 FOR CHAS REAR & U BRACKET X2,CHAS REAR & MAIN PCB
	8128142608	SCREW B/H W/CAP "B" 2.6X8 TITE FOR Q6
	8283113015	SCREW BIND(+) M3X15 MACH W/SPR FOR Q6
	8504113006	SCREW BID(+) M3X6 MACH W/DISK FOR Q308
	8504113010	SCREW BIND(+) M3X10 MACH W/DIS FOR D301,303,332,Q301,311,355
	8504113010	SCREW BIND(+) M3X10 MACH W/DIS FOR IC202
	9011094230	LABEL WARNING 28KV
	C488100015	CONN. 10P & WIRE ASS'Y FOR P3 & P4
BD1	4130600608	DIODE RBV-606 6A/600V
C10	5074104506	CAP-MEF 0.1UFJ 630V -SF-
C12	5156471T25	CAP-EC6 470UFM 25V -RT-
C13	5116102111	CAP-MC 0.001UFK 100V -RT-
C14	5092103615	CAP-PP .01UFG 100V P:10mm -SF-
C15	5156101T25	CAP-EC6 100UFM 25V -RT-
C16	5116472111	CAP-MC 0.0047UFK 100V -RT-
C17	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C18	5134104452	CAP-SCF 0.1UFZ 50V -RT-
C19	5128331552	CAP-CCSL 330PFJ 50V -RT-
C20	5101471193	CAP-CCB 470PFK 3KV -SF-
C202	5156221T35	CAP-EC6 220UFM 35V -RT-
C203	5101102152	CAP-CCB 1000PFK 50V -RT-
C206	5113224111	CAP-MC 0.22UFK 100V -SF-
C207	5116104150	CAP-MC 0.1UFK 50V -RT-
C208	5116103111	CAP-MC 0.01UFK 100V -RT-
C21	5156100S02	CAP-EC6 10UFM 160V -SF-
C22	5101101132	CAP-CCB 100PFK 1KV -RT-
C23	515X151S02	CAP-ECX 150UFM 160V -SF-
C231	515X471S25	CAP-ECX 470UFM 25V -SF-
C232	515X471S25	CAP-ECX 470UFM 25V -SF-
C24	515X101S01	CAP-ECX 100UFM 100V -SF-
C25	515F471S25	CAP-ECF 470UFM 25V -SF-
C27	515X102S25	CAP-ECX 1000UFM 25V -SF-
C28	5074104101	CAP-MEF 0.1UFK 100V -SF-

Safety Standards and Approvals

- This monitor complies with DHHS Rules 21 CFR Subchapter J Applicable at date of manufacture.
- Certified to comply with the limits for a Class B computing device pursuant to part 15 of FCC rules
- Please refer to instructions included FCC notice in the user's manual if this equipment is suspected of causing interference to radio reception.

Important Safety Notice

This equipment contains special components which are important for safety. These critical parts should only be replaced with the parts specified by the manufacturer in order to prevent X-radiation, shock, fire or other hazards. Do not modify the original design.

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Preface
Before You Start

General Safety Precautions

1. Use an isolation transformer in the power line and AC supply to troubleshoot.
2. When servicing, observe the original lead dress, especially in the high voltage circuits. If a short circuit is found, replace all parts which have been overheated or damaged.
3. Before turning the display on, measure the resistance between B+ line and chassis ground. Connect the negative side of an ohmmeter to the B+ lines and the positive side to chassis ground. Each line should have more resistance than the following specifications:

B+ Line	Minimum Resistance
+200V	119.58KΩ
+75V	8.77KΩ
+15.0V	2.11KΩ
+12.0V	0.2KΩ
-15V	20.04KΩ
+6.3V	4.69Ω
+5.0V	1.29KΩ

4. Potentials, as high as 26kV are present when this display is in operation. Operation of the display without the rear cover involves the danger of a shock hazard from the display power supply. Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high voltage equipment. Always discharge the anode of the picture tube to the display chassis before handling the tube.
5. After servicing, be sure to check the items listed in the Safety Checkout, below before returning the serviced unit to the customer.

Safety Checkout

The following checks MUST be made after correcting the original service problem and before the unit is returned to the customer.

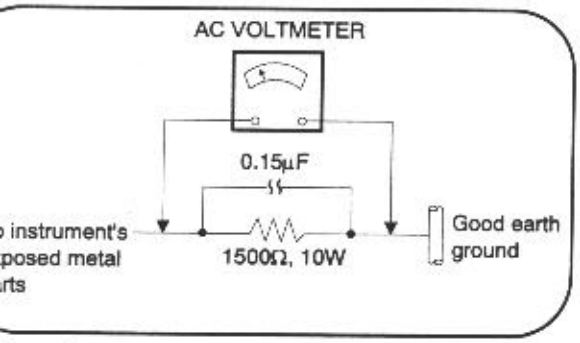
1. Check the area of your repair for unsoldered or poorly soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the inter board wiring to ensure that no wires are pinched or coated with high-wattage resistors.
3. Check that all control knobs, shields, covers, ground straps and mounting hardware have been replaced. Make absolutely sure you have replaced all the insulators.
4. Look for any unauthorized replacement parts, particularly transistors, that may have been installed during a previous repair. Point them out to the customer and recommend their replacement.
5. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
6. Check the line cord for cracks and abrasion. Recommend the replacement of any such line cord to the customer.
7. After making any repair, check the B+ and HV to see whether they are at the values specified. Make sure your instruments are accurate; if your HV meter always shows a low HV, check the meter to ensure it is not malfunctioning.
8. Carry out the leakage current checks as detailed below overleaf.

eakage Current Cold Check

1. Unplug the AC cord and connect a jumper between the two prongs on the plug.
2. Turn on the display power switch.
3. Use an ohmmeter to measure the resistance value between the jumpered AC plug and each exposed metallic cabinet part on the display, such as screwheads, terminals, control shafts, etc. When an exposed metallic part has a return path to the chassis, the reading should be between 240k and 5.2M. When exposed metal does not have a return path to the chassis, the reading must be 0.

eakage Current Hot Check

1. Plug the AC cord into the AC outlet. DO NOT use an isolation transformer for this check.
2. Connect a 1.5k, 10 watt resistor in parallel with a 0.15F capacitor between each exposed metallic part on the set and a good earth ground (see How to Find a Good Earth, below) as shown in the diagram below.



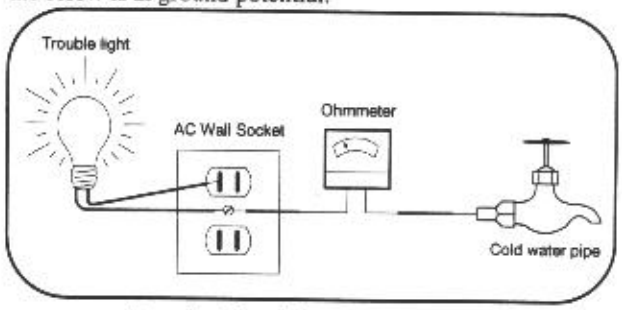
Example of Leakage Current Hot-Check Circuit

3. Use an AC voltmeter with 1000 ohms/volt or more sensitivity to measure the potential across the resistor.
4. Check each exposed metallic part, and measure the voltage at each point.
5. Reverse the polarity of the AC plug in the AC outlet and repeat the above measurements.
6. The potential at any point should not exceed 0.75 volt RMS. A leakage current tester (Simpson Model 229, RCA WT-540A or equivalent) may be used to make the hot checks.

kage current must not exceed 0.5 milliamp. If a measure- t is outside of the specified limit, there is a possibility of ock hazard and the monitor should be repaired and re- ked before it is returned to the customer.

How to Find A Good Earth

A cold water pipe is a guaranteed earth ground; the cover plate retaining screw on most AC outlet boxes is also at earth ground. If the retaining screw is to be used as your earth ground, verify that it is at ground by measuring the resistance between it and a cold water pipe with an ohmmeter. The reading should be zero (0) ohms. If a cold water pipe is not accessible, connect a 60 - 100 watt trouble light (not a neon lamp) between the hot side of an AC power receptacle and the retaining screw. Try both slots, if necessary, to locate the hot side of the line. The lamp should light at normal brilliance if the screw is at ground potential.



How to Check for Earth Ground

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